

# SERVICE MANUAL (II) LEGANZA

## FOREWORD

This manual includes procedure for maintenance, adjustment, service operation and removal and installation of components.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of manual approval.

The right is reserved to make changes at any time without notice.



**DAEWOO MOTOR CO., LTD.**

INCHON, KOREA

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# **STEERING**

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## SECTION 6A

# POWER STEERING SYSTEM

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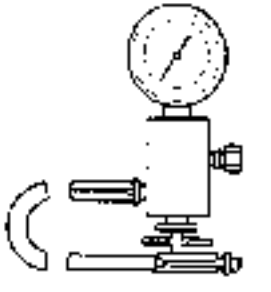
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Power Steering Pump Pressure Line Fitting	27	20	-
Steering Gear Inlet and Outlet Pipe Fittings	27	20	-
Return Line Clip Screws	3	-	27

## SPECIAL TOOLS

### SPECIAL TOOLS TABLE

 A105A009	<b>KM-354-B Pressure Test Gauge Kit</b>
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## DIAGNOSIS

### POWER STEERING SYSTEM PRESSURE TEST

#### Tools Required

KM-354-B Pressure Test Gauge Kit

Check the fluid pressure as follows to determine whether the trouble is in the pump or the gear unit.

#### Test Procedure

1. Check the power steering fluid level and the power steering pump belt tension. Refer to "Checking and Adding Fluid" in this section and Section 6B, *Power Steering Pump*.
2. Disconnect the high pressure line at the pump. Use a small container to catch any fluid.
3. Connect the hose of the pressure test gauge kit KM-354-B to the power steering pressure hose from the power steering pump.
4. Place the gear selector lever in PARK (automatic transaxle-equipped vehicles) or NEUTRAL (manual transaxle-equipped vehicles). Set the parking brake.
5. Open the gauge valve fully.
6. Start the engine and let it idle.
7. Turn the steering wheel from lock to lock several times to warm the fluid to operating temperature.
8. Increase the engine speed to 1,500 rpm.

**Notice:** The power steering pump could be damaged if the valve is fully closed for more than 5 seconds.

9. Close the gauge valve fully, and read the pressure. The pump pressure with the valve closed should be between 8 330 kPa to 8 820 kPa (1,208 psi to 1,279 psi).  
With Electronic Variable Orifice 8 500 the pressure should be between 8 960 kPa (1,293 psi to 1,299 psi).
10. Immediately open the gauge valve fully.
11. Turn the steering wheel all the way to the left and the right. If the pressure is within the specified limits, the problem is not in the pump. Check the power steering gear for leaks.

### POWER STEERING SYSTEM LEAK TEST

#### General Procedure

Inspect the following:

- The fluid reservoir for overflow.
- Fluid for aeration and overflow.
- The hoses for loose connections.
- The torsion bar, stub shaft and adjuster seals for leaks.
- The component sealing surfaces for damage.

**Important:** Verify the exact point of the leak. The point from which the fluid is dripping is not necessarily the point at which the system is leaking. When service is required, clean the leak area upon disassembly, replace the leaking seal, check the component sealing surfaces for damage and reset the torque bolt to specifications, where required.

#### External Leak Check

The purpose of this procedure is to pinpoint the location of the leak. In some cases, the leak can be easily located, but seepage-type leaks may be harder to find. To locate seepage leaks, use the following method:

1. With the engine off, wipe dry the complete power steering system.
2. Check the power steering fluid level in the pump's reservoir. Adjust the fluid level as necessary. Refer to "Checking and Adding Fluid" in this section.

**Notice:** Do not hold the steering wheel at a stop for any length of time as this can damage the power steering pump.

3. Start the engine. Turn the steering wheel counter-clockwise and clockwise from stop to stop several times.
4. Find the exact area of the leak and repair it.

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### BLEEDING THE POWER STEERING SYSTEM

If the power steering hydraulic system has been serviced, an accurate fluid level reading cannot be obtained until the air is bled from the system. Follow these steps to bleed the air from the system.

1. Turn the wheels all the way to the left and add the power steering fluid to the MIN mark on the fluid level indicator.

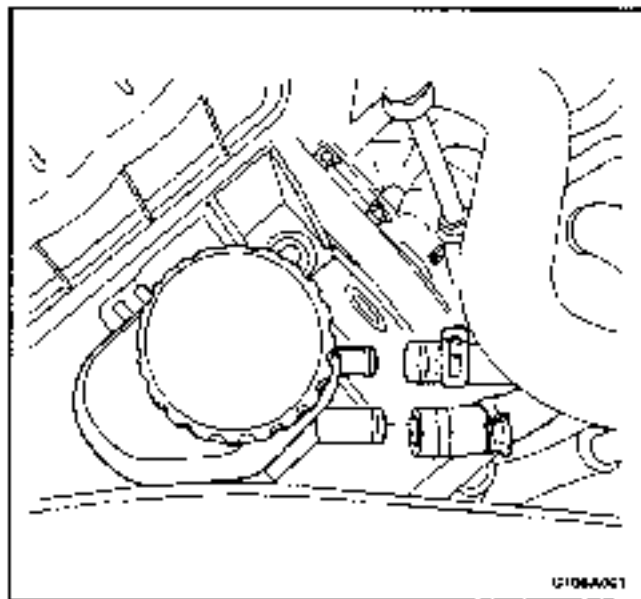
**Notice:** When adding fluid or making a complete fluid change, always use DEXRON<sup>®</sup>-II or III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

2. Start the engine. With the engine running at fast idle, recheck the fluid level. If necessary, add fluid to bring the level up to the MIN mark.
3. Bleed the system by turning the wheels from side to side without reaching the stop at either end. Keep the fluid level at the MIN mark. The air must be eliminated from the fluid before normal steering action can be obtained.
4. Return the wheels to the center position. Continue running the engine for 2 to 3 minutes.
5. Road test the car to be sure the steering functions normally and is free from noise.
6. Recheck the fluid level as described in steps 1 and 2. Make sure the fluid level is at the MAX mark after the system has stabilized at its normal operating temperature. Add fluid as needed.

#### CHECKING AND ADDING FLUID

**Notice:** When adding fluid or making a complete fluid change, always use DEXRON<sup>®</sup>-II or III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

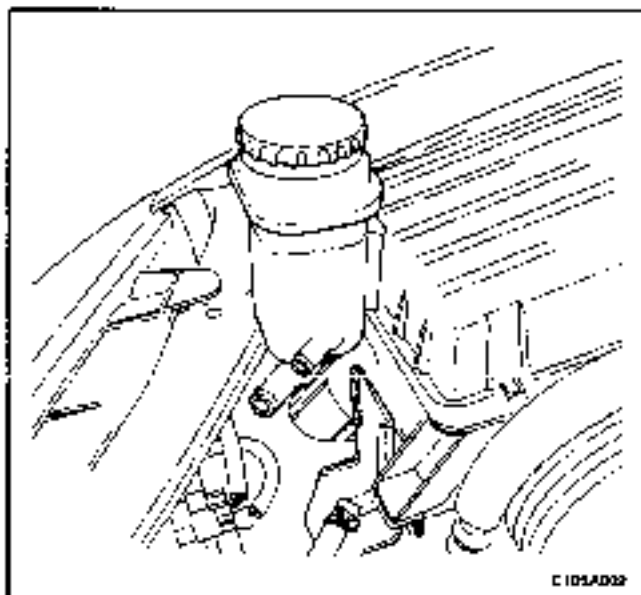
1. The power steering fluid level is indicated either by marks on a see-through fluid reservoir or by marks on a fluid level indicator on the fluid reservoir cap.
2. If the fluid is warmed up to 66°C (150°F), the fluid level should be between the MAX and MIN marks. Add fluid as needed.
3. If the fluid is cool, 21°C (70°F), the fluid level should be at the MIN mark. Add fluid as needed.



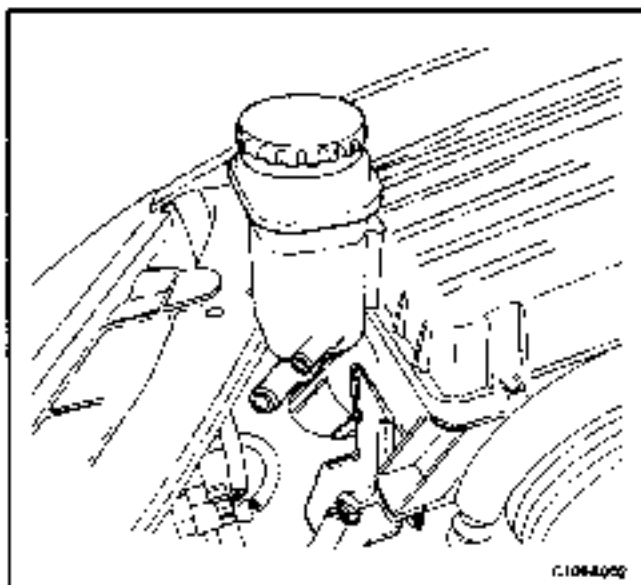
## FLUID RESERVOIR

### Removal Procedure

1. Siphon the power steering fluid from the fluid reservoir.
2. Loosen the hose clamps and remove both hoses from the fluid reservoir.



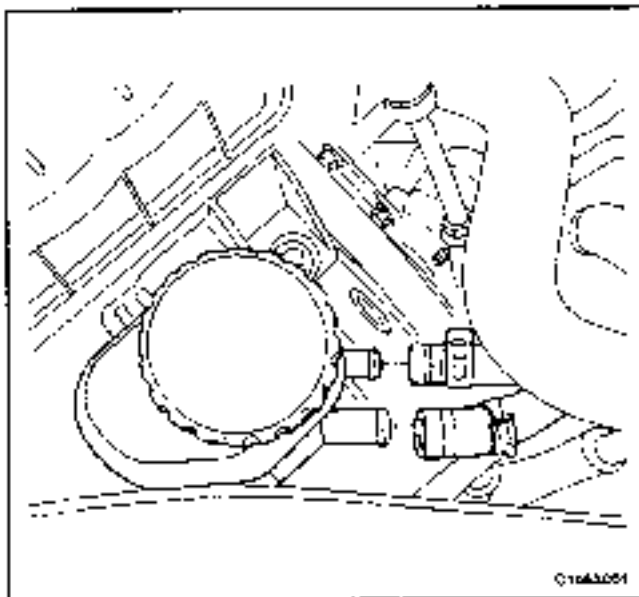
3. Remove the fluid reservoir by sliding it off the fluid reservoir bracket.



### Installation Procedure

1. Attach the fluid reservoir to the fluid reservoir bracket.

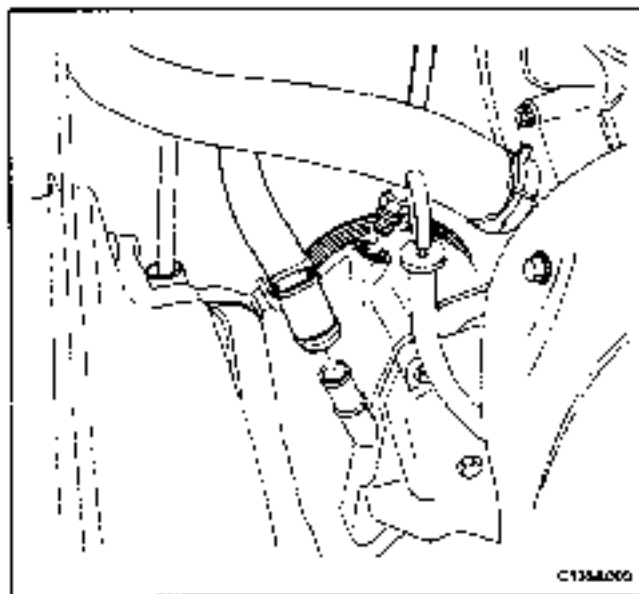




2. Connect both hoses to the fluid reservoir and secure the hose clamps.

**Notice:** When adding fluid or making a complete change, always use DEXRON<sup>®</sup>-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

3. Fill the fluid reservoir with power steering fluid.
4. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

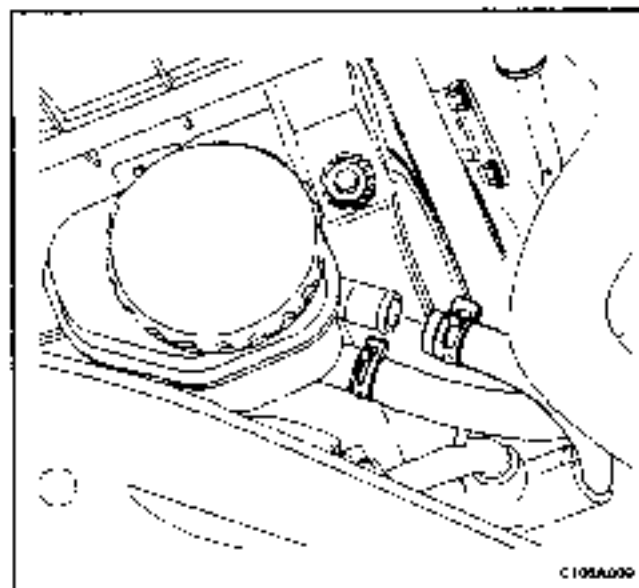


## HOSES AND PIPES

### Power Steering Pump Hoses and Pipes (Left-Hand Drive Shown, Right-Hand Drive Similar)

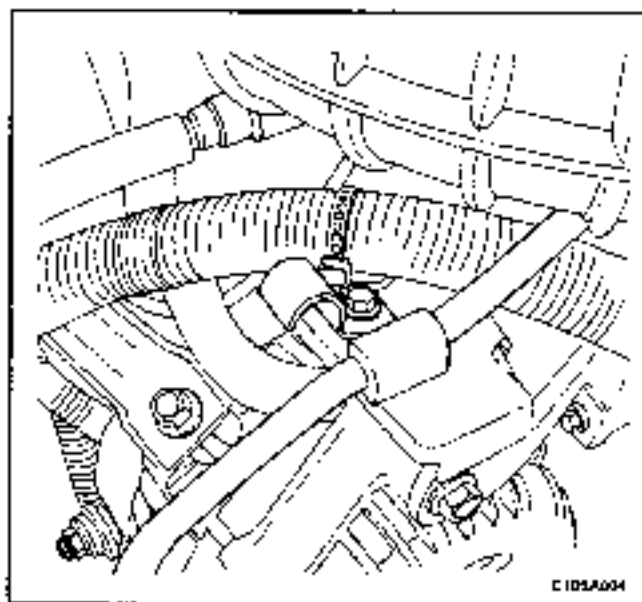
#### Removal Procedure

1. Siphon the power steering fluid from the fluid reservoir.
2. Disconnect the pressure line pipe and the supply line hose from the inlet and outlet connections on the power steering pump.

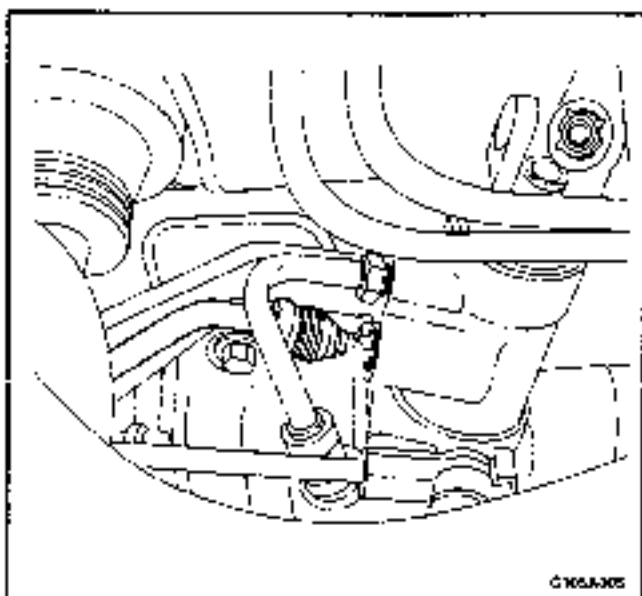


3. Disconnect the return line from the fluid reservoir.

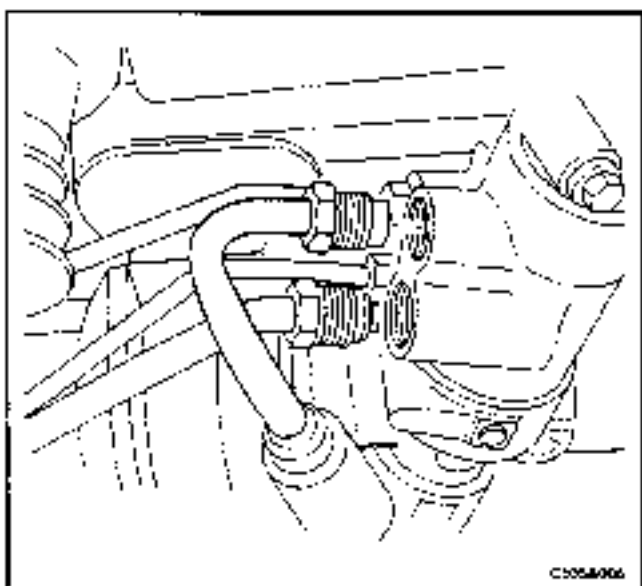
## 6A-6 POWER STEERING SYSTEM



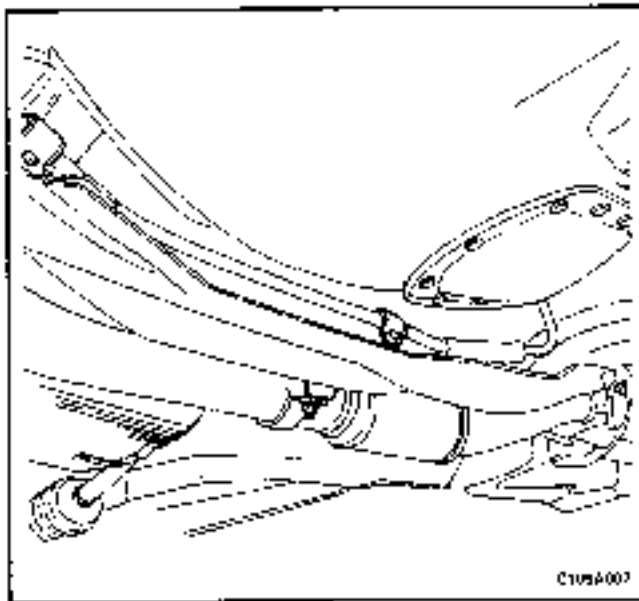
4. Loosen the retaining clip located above the alternator and position it away from the pressure line.



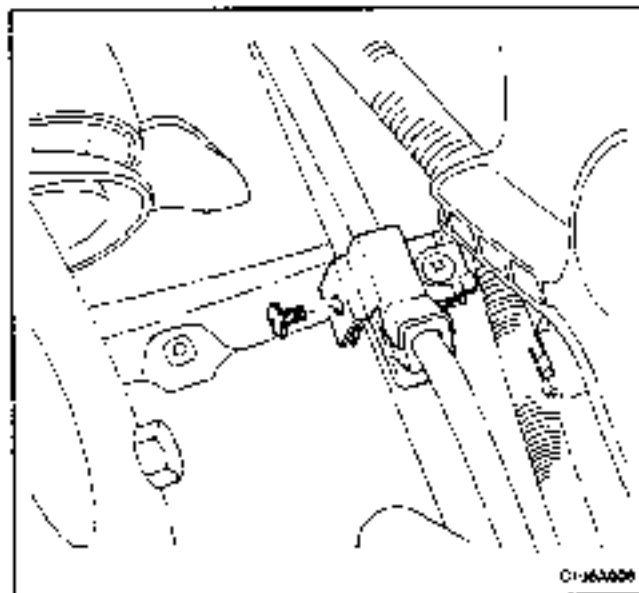
5. Raise and suitably support the vehicle.
6. Disconnect the pressure line from the power steering gear inlet.



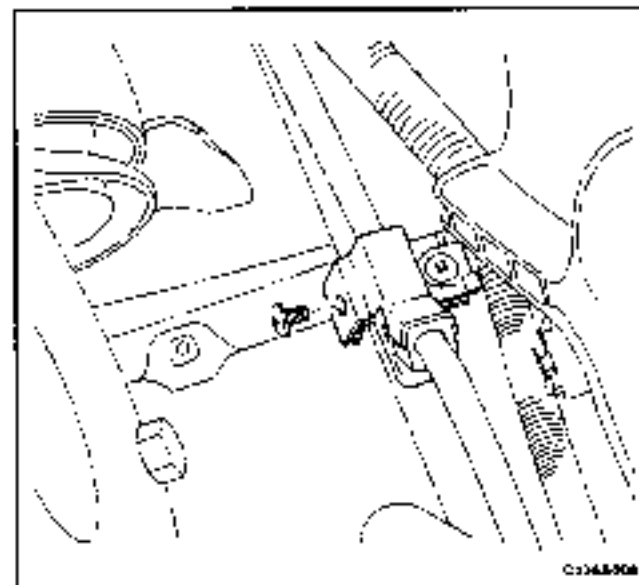
7. Disconnect the return line outlet pipe from the power steering gear.



8. Remove the return line from the clips on the frame rail.



9. Remove the screw from each of the two clips on the radiator support rail.
10. Remove the two clips from the radiator support rail.
11. Remove the return line from the vehicle.
12. Lower the vehicle.
13. Remove the pressure line from the vehicle.



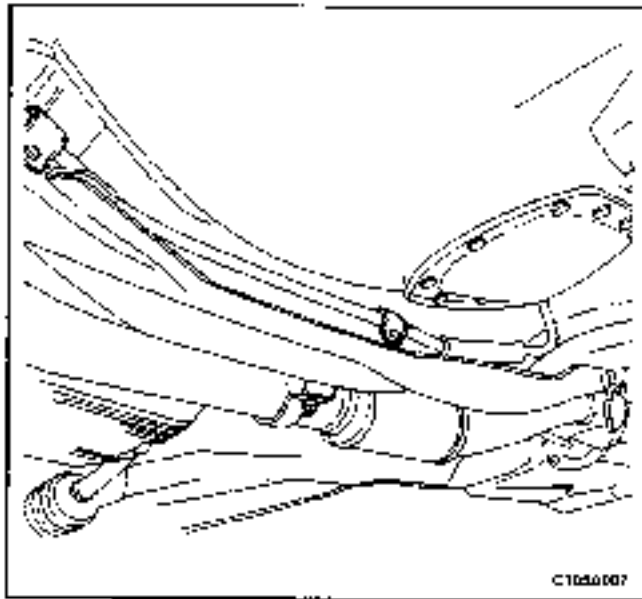
#### Installation Procedure

1. Route the pressure line from the power steering pump to the power steering gear.
2. Raise and suitably support the vehicle.
3. Route the return line from the fluid reservoir to the power steering gear.
4. Install the two clips on the radiator support rail.
5. Install the screw into each of the two clips.

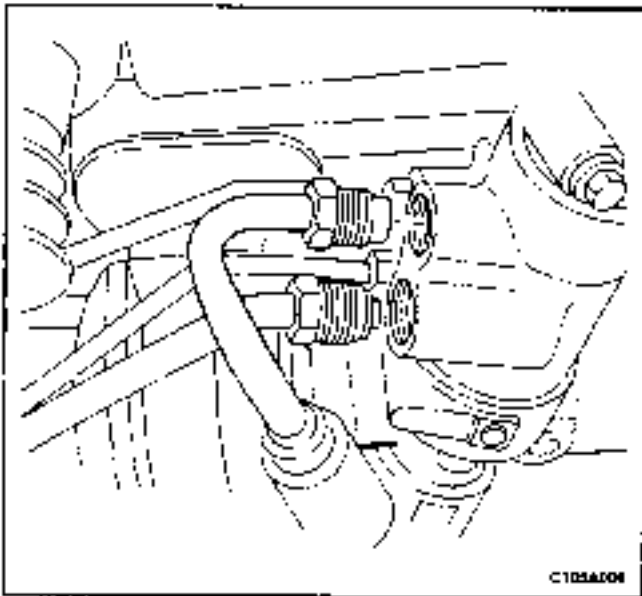
#### Tighten

Tighten the return line clip screws to 3 Nm (27 lb-in).

## 6A - 6 POWER STEERING SYSTEM



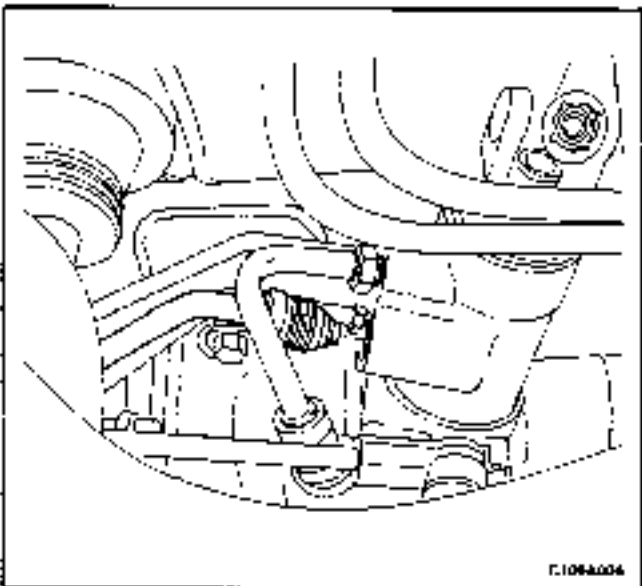
6. Install the return line into the clips on the frame rail



7. Connect the return line to the power steering gear outlet.

### **Tighten**

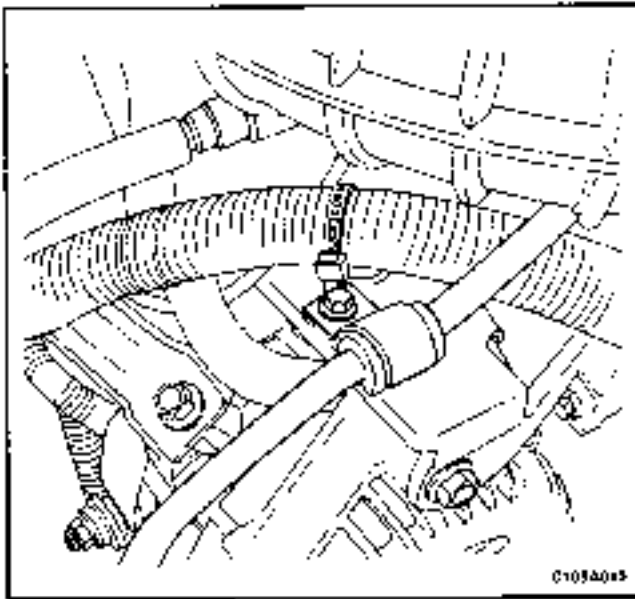
Tighten the return line fitting to 27 N•m (20 lb-ft)



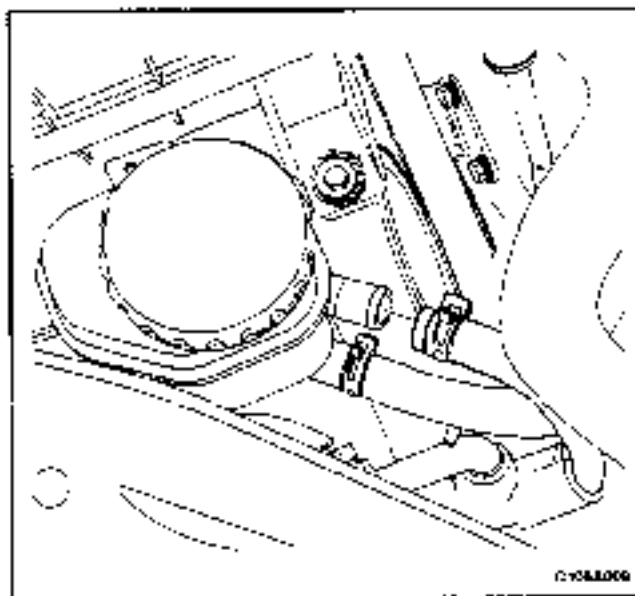
8. Connect the pressure line to the power steering gear inlet.

### **Tighten**

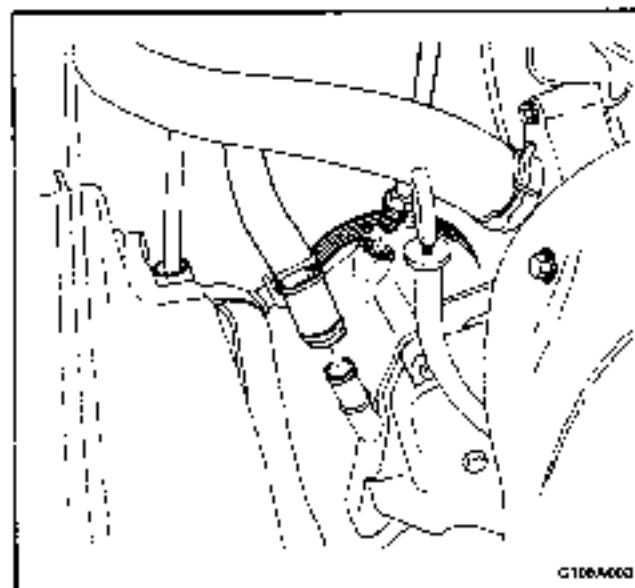
Tighten the pressure line fitting to 27 N•m (20 lb-ft)



9. Lower the vehicle.
10. Secure the pressure line with the retaining clip located above the alternator.



11. Connect the return line to the fluid reservoir.



12. Connect the pressure line pipe and the supply line hose to the outlet and inlet connections on the power steering pump.

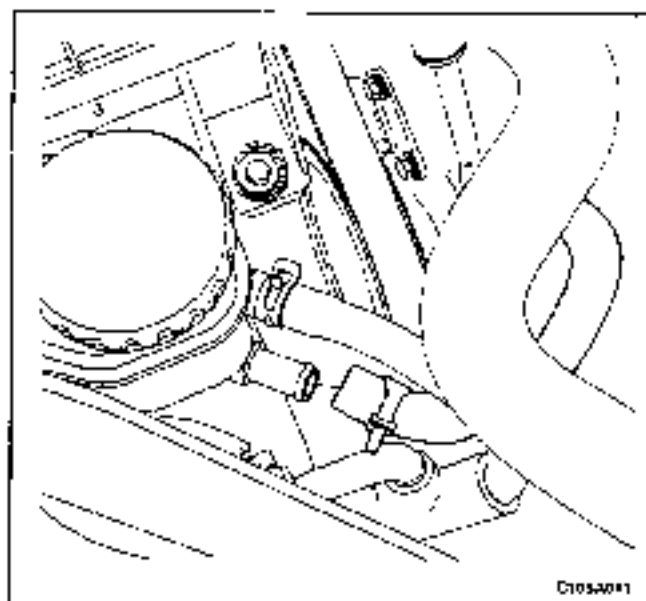
### Tighten

Tighten the pressure line fitting to 27 N·m (20 lb-ft).

**Notice:** When adding fluid or making a complete change, always use DEXRON<sup>®</sup> II or III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

13. Fill the fluid reservoir with power steering fluid.
14. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

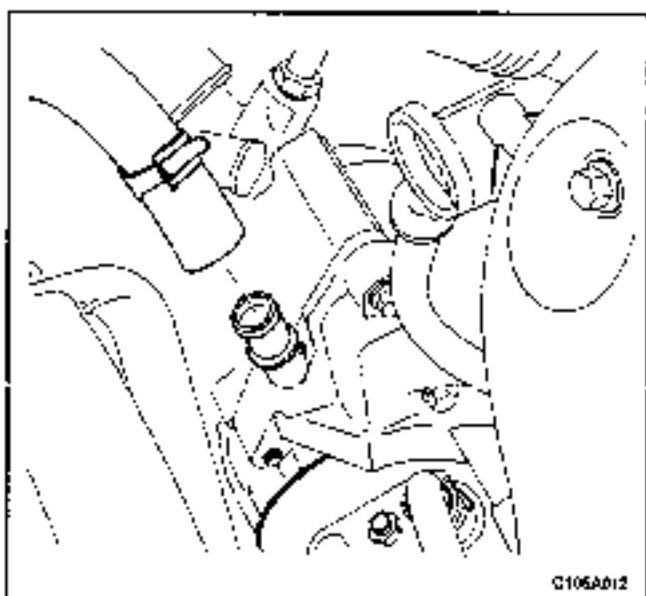
## 6A - 10 POWER STEERING SYSTEM



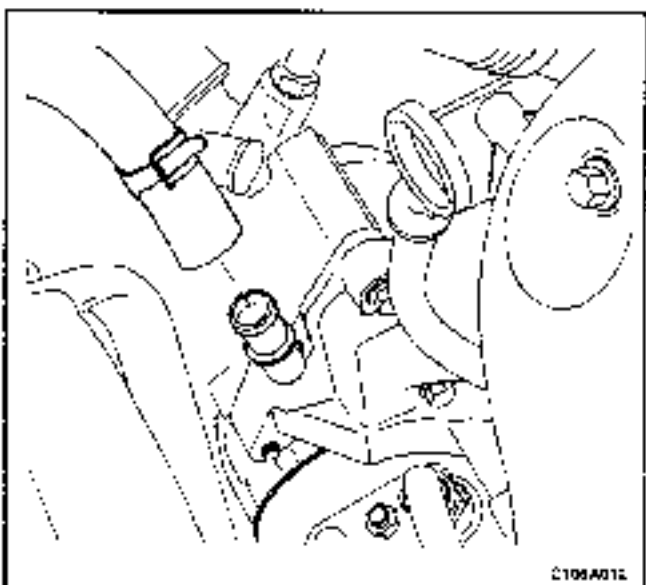
### Power Steering Fluid Supply Hose

#### Removal Procedure

1. Siphon the power steering fluid from the fluid reservoir.
2. Disconnect the fluid supply hose at the fluid reservoir lower connection.

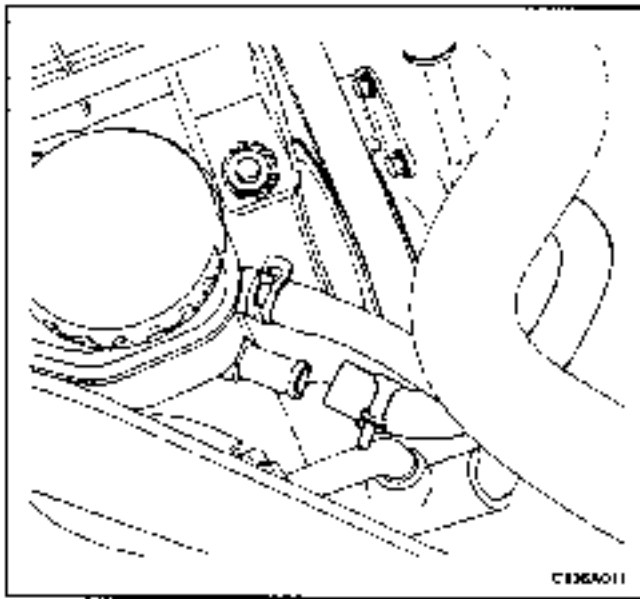


3. Disconnect the fluid supply hose from the power steering pump inlet. Use a rag to avoid any spillage.
4. Remove the power steering fluid supply hose.



#### Installation Procedure

1. Install the power steering fluid supply hose.
2. Connect the fluid supply hose to the power steering pump inlet.



3. Connect the fluid supply hose to the fluid reservoir lower connection.

**Notice:** When adding fluid or making a complete change, always use DEXRON<sup>®</sup>-II or III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

4. Fill the fluid reservoir with power steering fluid.
5. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### POWER STEERING SYSTEM

#### General Description

The power steering system consists of three components: the power steering pump, the power steering fluid reservoir and the power steering rack and pinion gear. The power steering pump is a vane-type pump providing hydraulic pressure for the system and is pow-

ered by the engine. It draws on the power steering fluid reservoir, which in turn is connected to the power steering gear. A pressure-relief valve inside the flow control valve limits the pump pressure. The power steering rack and pinion gear has a rotary control valve which directs hydraulic fluid coming from the power steering pump to one side or the other side of the rack piston. The integral rack piston is attached to the rack. The rack piston converts hydraulic pressure to a linear force which moves the rack to the left or the right. The force is then transmitted through the inner and the outer tie rods to the steering knuckles, which turn the wheels.



## SECTION 6B

# POWER STEERING PUMP

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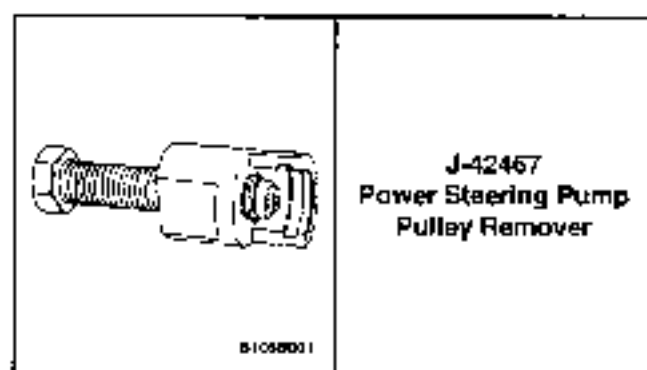
## SPECIFICATIONS

### GENERAL SPECIFICATIONS

Application	Description
Lubricant	Power Steering Fluid DEXRON <sup>®</sup> -II or III
Pressure - Without EVO	6 330 kPa ~ 6 820 kPa (1,208 psi ~ 1,279 psi)
With EVO	6 500 kPa ~ 6 960 kPa (1,233 psi ~ 1,299 psi)

### FASTENER TIGHTENING SPECIFICATIONS

Application	N-m	Lb-Ft	Lb-In
Air Filter Housing Assembly Bolts	6	-	53
High-Pressure Hose Fitting	28	21	-
Power Steering Pump Bolts	25	18	-
Power Steering Pump Pulley Nut (Without EVO)	61	44	-
Right Side Power Steering Pump Bracket Bolts	25	18	-

**SPECIAL TOOLS****SPECIAL TOOLS TABLE****DIAGNOSIS****POWER STEERING PUMP DIAGNOSIS****Foaming or Milky Power Steering Fluid (Air in Fluid)**

Checks	Action
Check for internal leakage in the power steering pump causing an overflow.	Repair the internal pump leakage. Bleed the system.
Check for a low fluid level.	Repair the internal pump leakage. Bleed the system. Cold temperatures will cause the air bubbles in the system if the fluid level is low.

**Low Pressure Due to Power Steering Pump**

Checks	Action
Check for an external leakage of the power steering pump at the seals.	Replace the seals. Repair the leak. Bleed the system.
Check for a worn serpentine accessory drive belt.	Replace the serpentine accessory drive belt.

**Low Pressure Due to Power Steering Gear**

Checks	Action
Check for a scored housing bore.	Replace the housing bore.
Check for leakage at the valve rings or the seals.	Repair the leak. Bleed the system.

**Groning Noise in the Power Steering Pump**

Checks	Action
Check for air in the power steering fluid.	Perform the checks listed in "Foaming or Milky Power Steering Fluid (Air in Fluid)" above.
Check for a low level of power steering fluid.	Repair any internal or external leaks. Bleed the system.
Check for a loose mounting of the power steering pump.	Tighten the pump mounting to specifications.

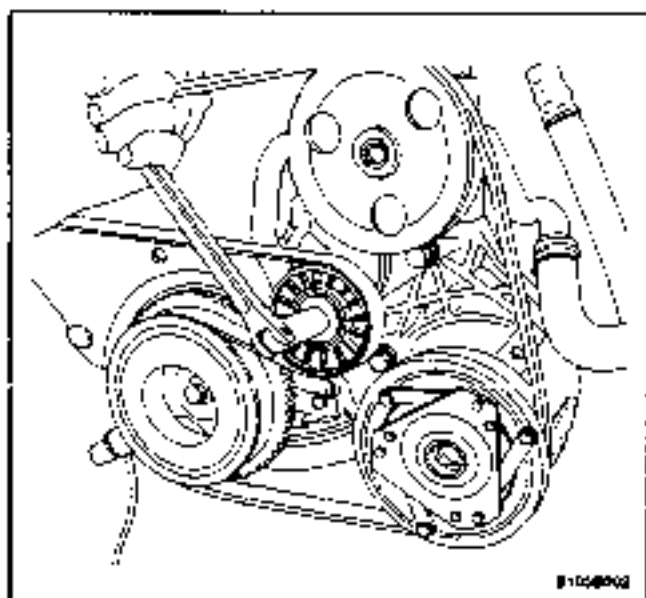
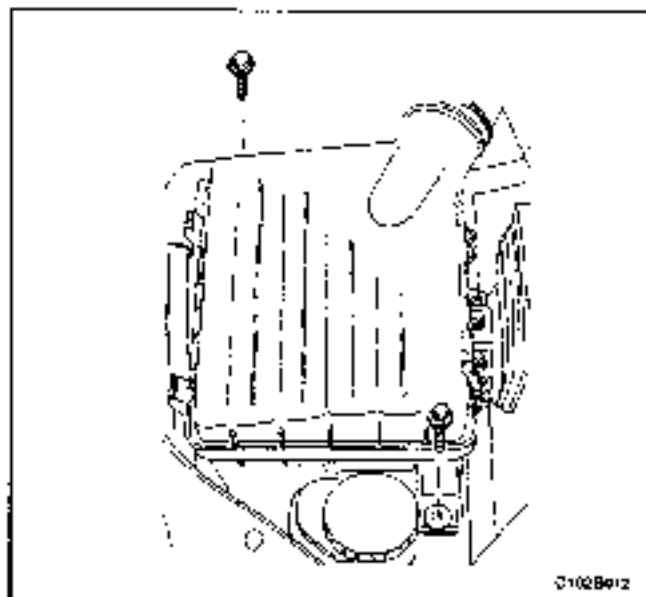
## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

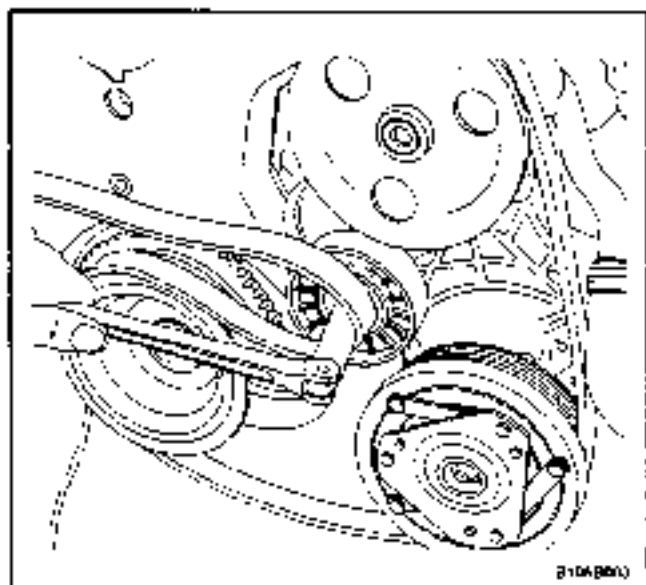
#### SERPENTINE ACCESSORY DRIVE BELT

##### Removal Procedure

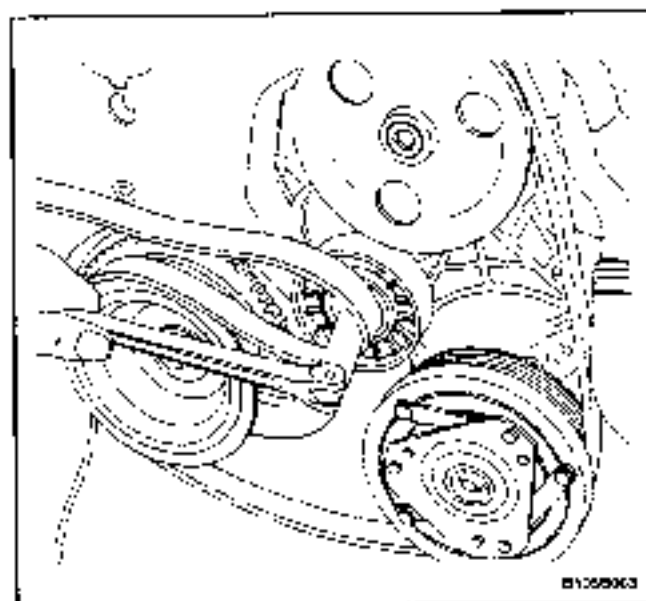
1. Remove the air filter housing assembly bolts and the air intake tube.
2. Remove the air filter housing assembly from the vehicle.



3. Use a wrench to turn the tensioner bolt clockwise, compressing the tensioner, and releasing the tension on the serpentine accessory drive belt.

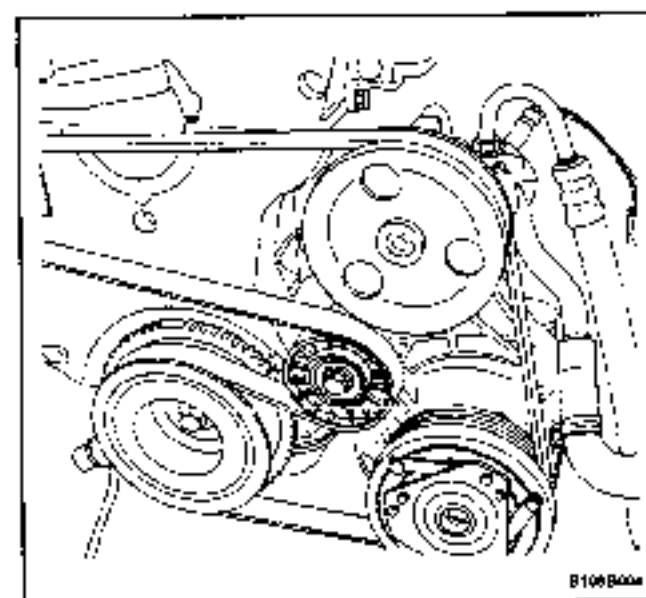


4. Remove the serpentine accessory drive belt.

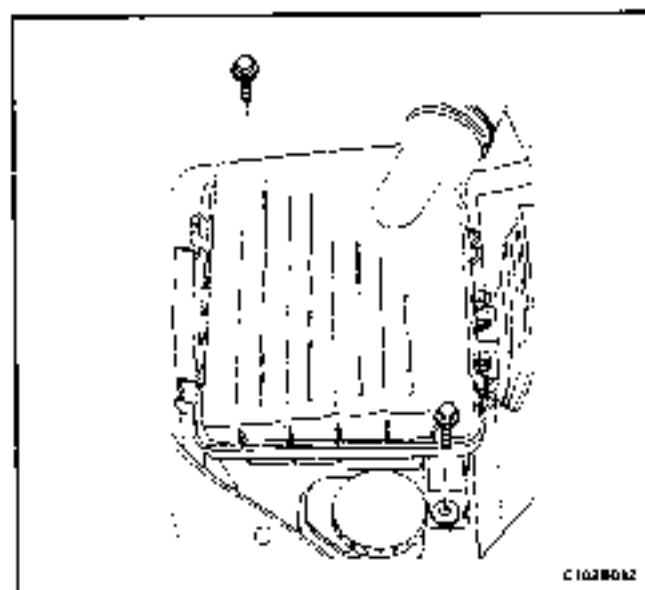


### Installation Procedure

1. Use a wrench to turn the tensioner bolt clockwise, compressing the tensioner, and releasing the tension on the serpentine accessory drive belt.
2. With the wrench in place on the tensioner bolt, loop the serpentine accessory drive belt loosely over the pulleys.



3. Slip the belt over the tensioner.
4. Remove the wrench from the tensioner bolt and the belt will tighten itself.



5. Install the air filter housing assembly into the vehicle.
6. Install the air intake tube and the air filter housing assembly bolts.

### Tighten

Tighten the air filter housing assembly bolts to 6 N·m (53 lb-in).

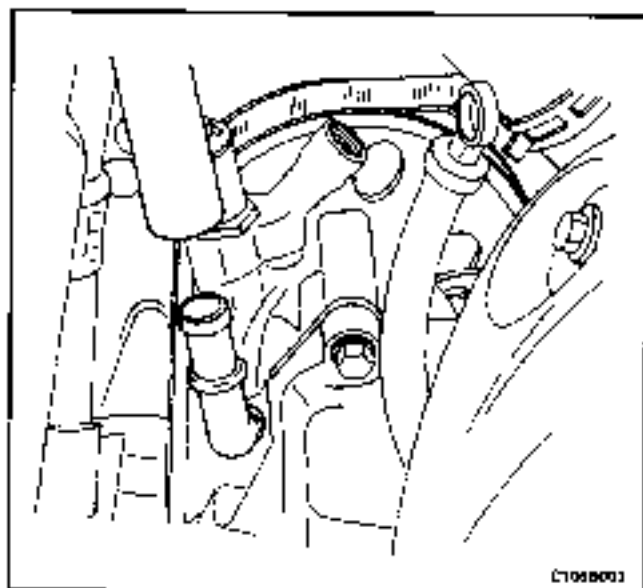
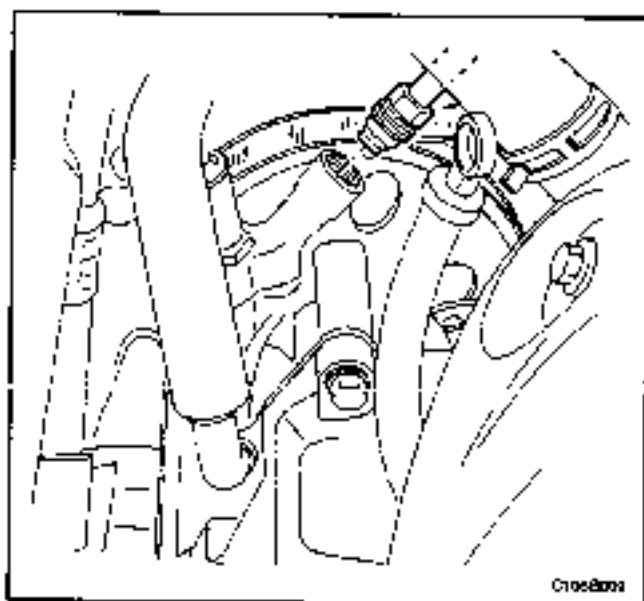
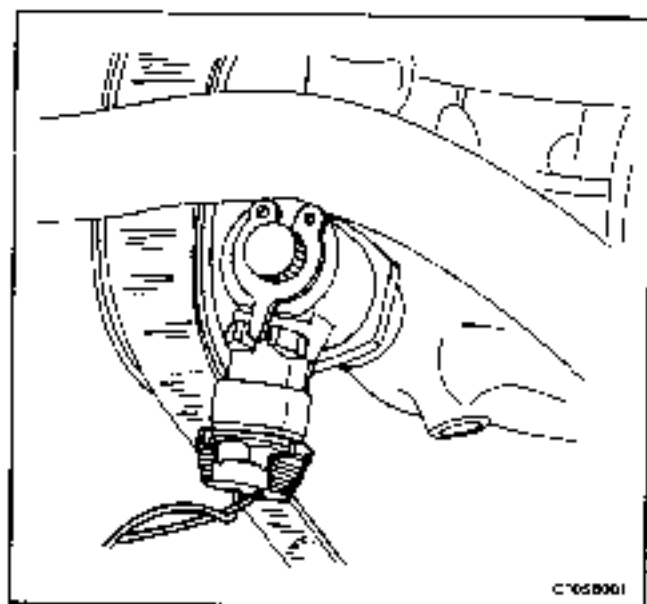
## PUMP ASSEMBLY

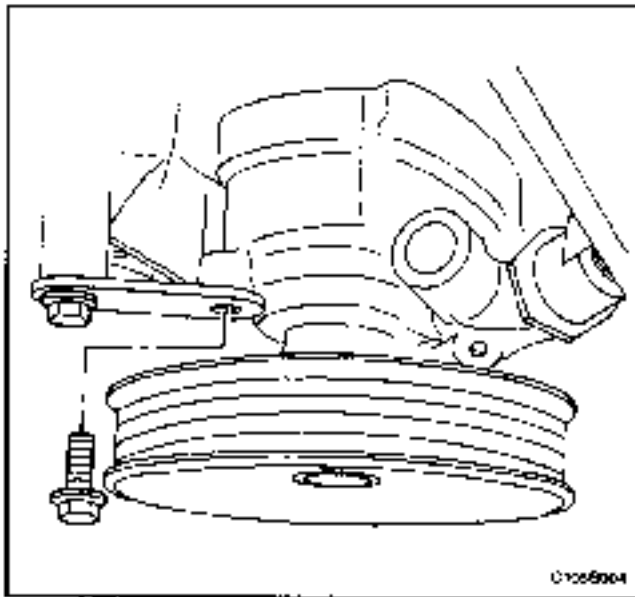
### Removal Procedure

1. Remove the serpentine accessory drive belt. Refer to "Serpentine Accessory Drive Belt" in this section.
2. Disconnect the electrical connector at the Electronic Variable Orifice (EVO) solenoid actuator.

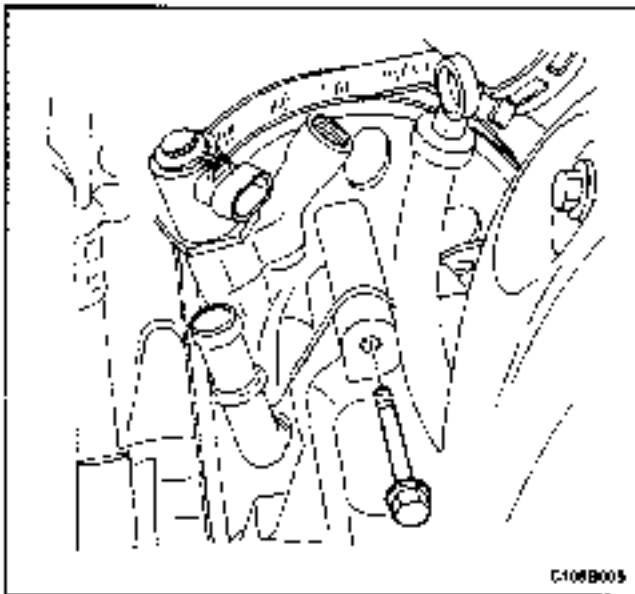
3. Position a drain pan to catch the power steering fluid that will drain from the high-pressure hose after it is disconnected from the power steering pump.
4. Disconnect the high-pressure hose from the power steering pump.

5. Position a drain pan to catch the power steering fluid that will drain from the supply hose after it is disconnected from the power steering pump.
6. Disconnect the supply hose from the power steering pump.

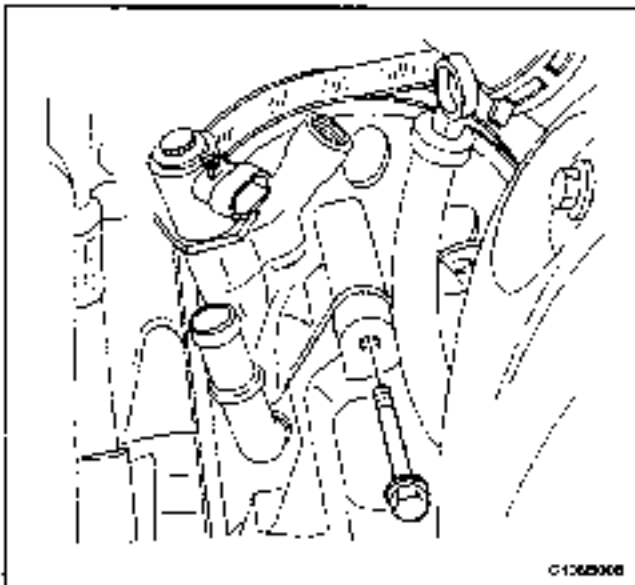




7. Remove the bolt from the front right side of the power steering pump. Loosen the rear right bolt and swing the bracket out of the way.



8. Remove the two long power steering pump bolts and remove the power steering pump from the vehicle.



### Installation Procedure

1. Install the power steering pump into the vehicle and install the two long power steering pump bolts.

#### Tighten

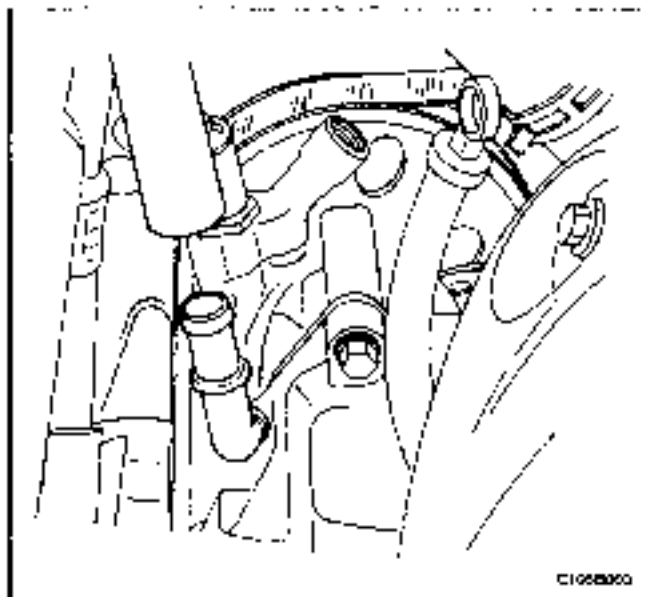
Tighten the two long power steering pump bolts to 25 N•m (18 lb-ft).

2. Swing the power steering pump bracket down and install the front right side bolt.

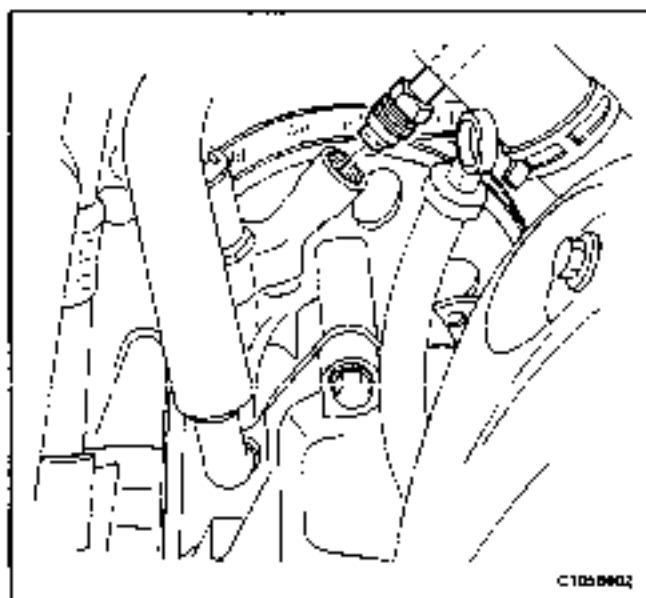
#### Tighten

Tighten the bolts of the right side power steering pump bracket to 25 N•m (18 lb-ft).

## 6B - 8 POWER STEERING PUMP



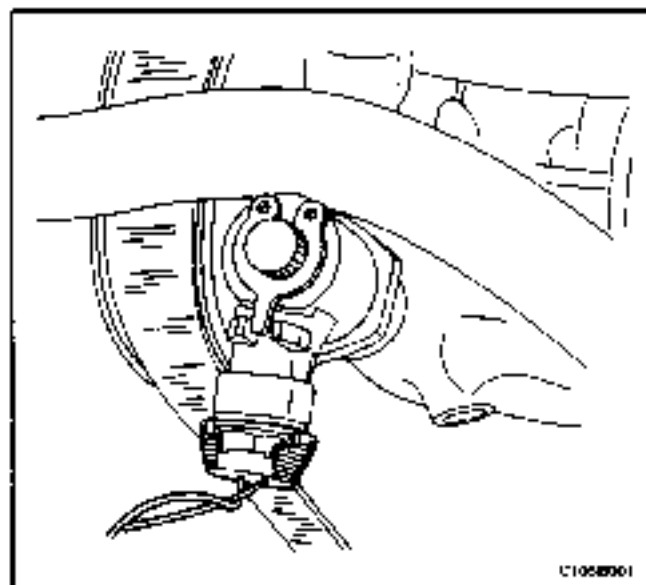
3. Connect the supply hose to the power steering pump.



4. Connect the high-pressure hose fitting to the power steering pump.

### **Tighten**

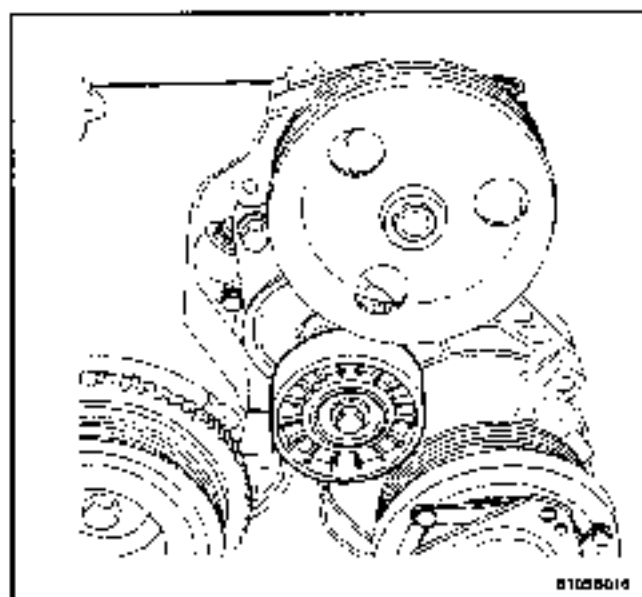
Tighten the high-pressure hose fitting to 28 N·m (21 lb-ft).



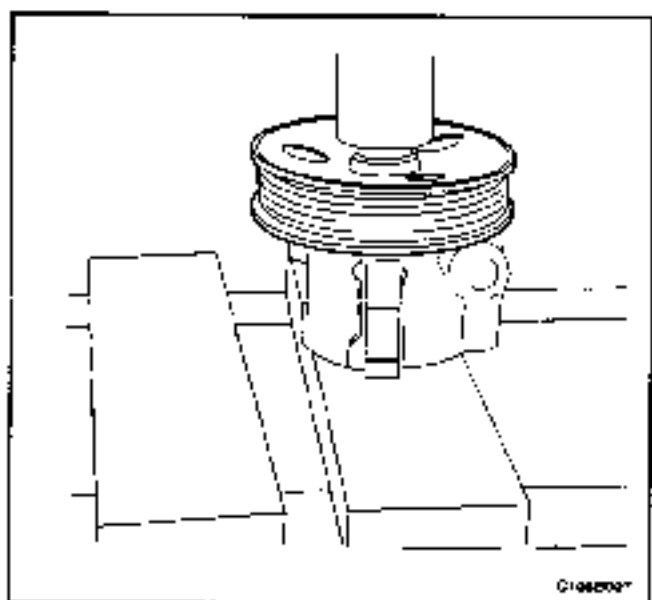
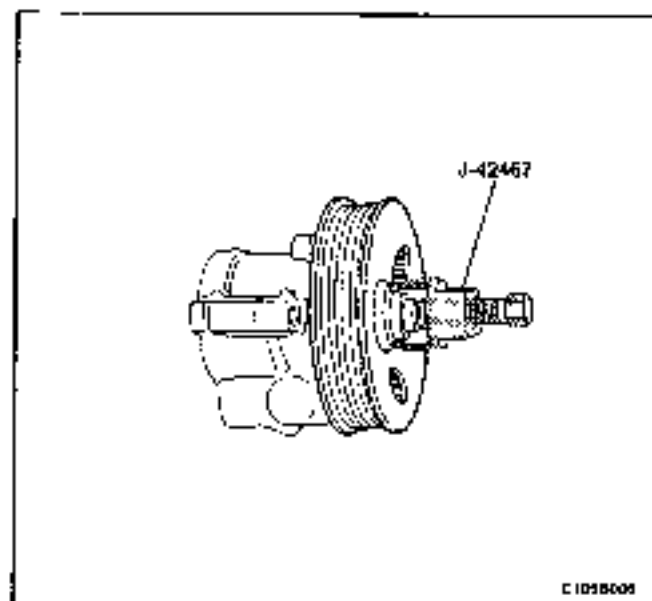
5. Connect the electrical connector at the Electronic Variable Orifice (EVO) solenoid actuator.



## POWER STEERING PUMP 6B-9



6. Install the serpentine accessory drive belt. Refer to "Serpentine Accessory Drive Belt" in this section.
7. Refill the power steering fluid. Refer to Section 6A, Power Steering System
8. Bleed the power steering system. Refer to Section 6A, Power Steering System



## UNIT REPAIR

### PUMP

#### Tools Required

J-42467 Power Steering Pump Pulley Remover

#### Disassembly Procedure

**Important:** The power steering pump in this vehicle is not serviceable. Replace, do not repair, a faulty power steering pump. Refer to "Power Steering Pump Diagnosis" in this section.

1. Remove the power steering pump from the vehicle if equipped EVO system. Refer to "Pump Assembly" in this section.
2. Using the power steering pump pulley remover J-42467, press the power steering pump from the pulley.
3. Without EVO system, remove power steering pump pulley nut (Do not remove the power steering pump from the vehicle).

#### Assembly Procedure

1. Press the power steering pump pulley onto the power steering pump using a hydraulic press if equipped EVO system.
2. Install the power steering pump onto the vehicle. Refer to "Pump Assembly" in this section.
3. Install the power steering pump pulley nut (the vehicle is not equipped EVO system).

#### Tighten

Tighten the power steering pump pulley nut to 61 N·m (44 lb-ft).

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### POWER STEERING PUMP

The power steering pump is a multivaned hydraulic pump.

The serpentine accessory drive belt on the engine drives the power steering pump.

The power steering pump provides the hydraulic pressure to the power steering gear.

The power steering gear uses the hydraulic pressure to assist in steering the vehicle.

The power steering system uses a remote reservoir in order to make available more space in the engine compartment.



## SECTION 6C

# POWER STEERING GEAR

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### GENERAL SPECIFICATIONS

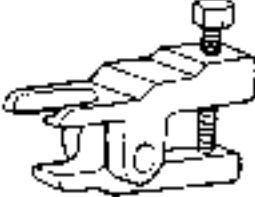
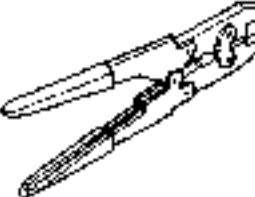
Application	Description
Capacity	1.0 Liter (1.06 qt)
Lubricant	Power Steering Fluid DEXRON <sup>®</sup> -II or III

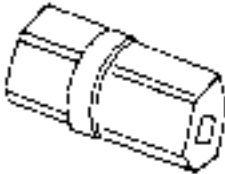
## FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Adjuster Plug	12	-	106
Adjuster Plug Locknut	75	56	-
Control Module Bracket Bolts	7	-	62
Dash Seal Retaining Ring Nuts	7	-	62
Hydraulic Cylinder Line Fittings - Cylinder End	27	20	-
Hydraulic Cylinder Line Fittings - Valve End	18	13	-
Inner Tie Rod	100	74	-
Intermediate Shaft Pinch Bolts	25	18	-
Outer Tie Rod Adjusting Nut	64	47	-
Outer Tie Rod Nuts	50	37	-
Pinion Locknut	30	22	-
Pinion Preload	1	-	9
Steering Gear Inlet and Outlet Pipe Fittings	28	21	-
Steering Gear Mounting Bracket Nuts and Bolts	60	44	-
Transaxle Center Bracket-to-Engine Bolt	90	66	-

## SPECIAL TOOLS

## SPECIAL TOOLS TABLE

 <p style="text-align: center;">KM-507-B Ball Joint Remover</p> <p style="text-align: center;">A108C034</p>	
 <p style="text-align: center;">KM-J-22610 Installer</p> <p style="text-align: center;">A108A008</p>	

 <p style="text-align: center;">J-42459 Rack Guide Spring Cap Wrench</p> <p style="text-align: center;">C108C001</p>	
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**DIAGNOSIS****POWER RACK AND PINION STEERING GEAR****Hissing Noise**

Checks	Action
Check the intermediate shaft joints for looseness.	Tighten the intermediate shaft joints
Check the power steering hose for contact with other components.	Be sure the power steering hose is correctly fitted into the hose clips

**Rattling Noise in Steering Gear**

Checks	Action
Check the power steering hose for contact with the body	Be sure the power steering hose is correctly fitted into the hose clips
Check the steering gear for insufficient lubrication.	Lubricate the steering gear
Check the steering gear mounting for improper installation.	Tighten the steering gear mounting bracket nuts and bolts
Check the outer tie rods for improper installation.	Tighten the outer tie rod joints. Replace the outer tie rods.

**Poor Return of Steering Wheel to Center**

Checks	Action
Check the steering wheel for contact with the turn signal housing.	Adjust the turn signal housing.
Check the intermediate shaft joints for binding or looseness.	Replace the intermediate shaft
Check the power steering pump flow control valve for sticking and improper alignment.	Replace the power steering pump.
Check the wheel alignment	Align the wheels.
Check the wheel bearings for wear or damage	Replace the wheel bearings
Check the intermediate shaft joints for improper installation.	Adjust the intermediate shaft between the steering gear and the steering column. Replace the intermediate shaft.
Check the outer tie rods and the ball joints for binding or looseness	Tighten the tie rods and the ball joints. Replace the tie rods and the ball joints
Check the steering gear adjustments.	Perform a straight-ahead check.
Check the steering column shaft seal for rubbing on the shaft	Replace the dash seal.
Check the steering shaft bearings for binding.	Replace the stub shaft bearings.

**Momentary Increase in Effort When Turning the Wheel Quickly**

Checks	Action
Check the power steering pump for internal leaks.	Replace the power steering pump.
Check the hoses for damage or restricted flow	Replace the power steering hoses and/or pipes.
Check the power steering fluid level.	Fill the power steering fluid reservoir.
Check the power steering pump flow control valve for sticking and improper operation.	Replace the power steering pump.

## 6C-4 POWER STEERING GEAR

### Steering Surges or Jerks When Turning with Engine Running

Checks	Action
Check the power steering pump for insufficient pressure.	Replace the power steering pump.
Check the power steering pump flow control valve for sticking and improper operation.	Replace the power steering pump.
Check the power steering pump serpentine belt for slippage.	Tighten the power steering serpentine belt.
Check for air contamination in the power steering system.	Bleed the power steering system.

### Steering Vibrates During Low Speed or Static Steering

Checks	Action
Check for air contamination in the power steering system.	Bleed the power steering system.
Check the power steering pump serpentine belt for looseness.	Tighten the power steering serpentine belt.

### Excessive Wheel Kickback or Loose Steering

Checks	Action
Check for air contamination in the power steering system.	Bleed the power steering system.
Check the wheel bearings for wear or damage.	Replace the wheel bearings.
Check the steering gear mounting for improper installation.	Tighten the steering gear mounting bracket nuts and bolts.
Check the intermediate shaft joints for improper installation.	Adjust the intermediate shaft between the steering gear and the steering column. Replace the intermediate shaft.
Check the outer tie rods and ball joints for looseness.	Tighten the tie rods and the ball joints. Replace the tie rods and the ball joints.

### Hard Steering or Lack of Assist (Especially During Parking)

Checks	Action
Check the intermediate shaft joints for improper installation.	Adjust the intermediate shaft between the steering gear and the steering column. Replace the coupling flange.
Check the power steering pump flow control valve for sticking and improper installation.	Replace the power steering pump.
Check the power steering pump for insufficient pressure.	Replace the power steering pump.
Check the power steering pump for internal leaks.	Replace the power steering pump.
Check for a loose or a worn intermediate shaft.	Tighten the intermediate shaft. Replace the intermediate shaft as needed.
Check the power steering pump serpentine belt tension.	Tighten the power steering serpentine belt.



## POWER RACK AND PINION STEERING GEAR BENCH TESTING

### Removal, Setup and Testing Procedure

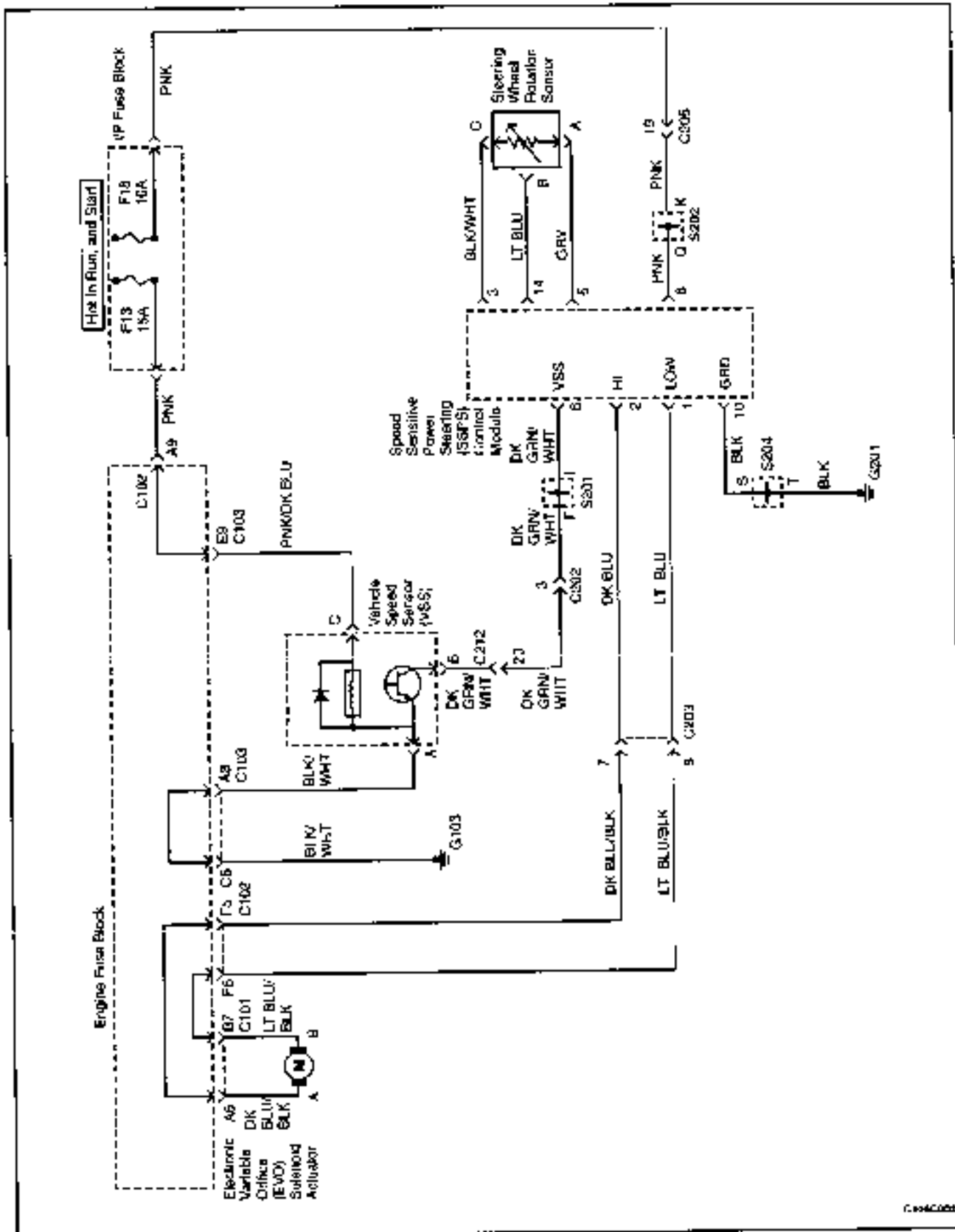
**Notice:** Pressure checks or pressure and flow checks may also be conducted using this set-up.

1. Disconnect and remove the power steering gear. Refer to "Rack and Pinion Assembly" in this section.
2. Place the power steering gear on a bench next to the vehicle.
3. Disconnect the pressure line at the point where the hose connects to the pipe. Extend this line in order to reach the power steering gear on the bench.
4. Disconnect the return line from the the power steering fluid reservoir. Extend this line in order to reach the power steering gear on the bench.
5. Connect the power steering pipes to the power steering gear.
6. Start the engine and allow it to idle for 10 seconds.
7. Check the power steering fluid level. Refer to Section 6A, *Power Steering System*.
8. Start the engine and turn the rack and pinion stub shaft to a full turn in each direction. Hold the shaft against each stop for 5 seconds.
9. Inspect for possible leak points. Refer to Section 6A, *Power Steering System*.

### Installation Procedure

1. Stop the engine.
2. Disconnect the power steering pipes from the power steering gear.
3. Remove the extensions and reconnect the pressure and return lines.
4. Install and connect the power steering gear. Refer to "Rack and Pinion Assembly" in this section.
5. Start the engine and allow it to idle for 10 seconds.
6. Check the power steering fluid level. Refer to Section 6A, *Power Steering System*.

**SPEED SENSITIVE POWER STEERING SYSTEM**



C-104-C005

## SPEED SENSITIVE POWER STEERING SYSTEM OPERATING WITH FULL ASSIST AT ALL TIMES

Step	Action	Value(s)	Yes	No
1	Perform an initial inspection of the power steering system. Is the system operational?	-	Go to Step 2	Go to Section 6A, Power Steering System
2	Check the speedometer. Is the speedometer inoperative?	-	Go to Section 5, Transaxle	Go to Step 3
3	Check the diagnostic trouble codes at the engine control module (ECM). Is the ECM code 24 set?	-	Go to Section 1F, Engine Controls	Go to Step 4
4	1. Turn the ignition ON 2. Disconnect the electronic variable orifice (EVO) solenoid actuator electrical connector at the power steering pump 3. Probe terminal A of the EVO actuator connector with a voltmeter. Does the voltmeter display the specified value?	≈ 3 v	Go to Step 6	Go to Step 5
5	Repair the open or short in the circuit between terminal A of the EVO solenoid actuator electrical connector and terminal 2 on the speed sensitive power steering (SSPS) control module connector. Is the repair complete?	-	System OK	-
6	1. Remove the EVO solenoid actuator from the power steering pump. 2. Turn the actuator upside down to position the pinle. 3. Stimulate the actuator by connecting it to the battery. Does the actuator click?	-	Go to Step 8	Go to Step 7
7	Replace the EVO solenoid actuator. Is the repair complete?	-	System OK	-
8	1. Turn the ignition OFF 2. Remove the SSPS control module from the control module bracket. 3. Disconnect the SSPS control module connector. 4. Connect a test light from terminal 8 on the SSPS control module connector to the ground. 5. Turn the ignition ON Is the test light on?	-	Go to Step 14	Go to Step 9
9	Check the ignition fuse. Is the ignition fuse open?	-	Go to Step 10	Go to Step 11
10	Replace the ignition fuse. Is the repair complete?	-	System OK	-
11	Check for an open or short in the circuit between terminal 8 of the control module connector and the I/P fuse block. Is the connection faulty?	-	Go to Step 12	Go to Step 13
12	Repair the open or short in the circuit between terminal 8 of the SSPS control module connector and the I/P fuse block. Is the repair complete?	-	System OK	-

**SPEED SENSITIVE POWER STEERING SYSTEM  
OPERATING WITH FULL ASSIST AT ALL TIMES (Cont'd)**

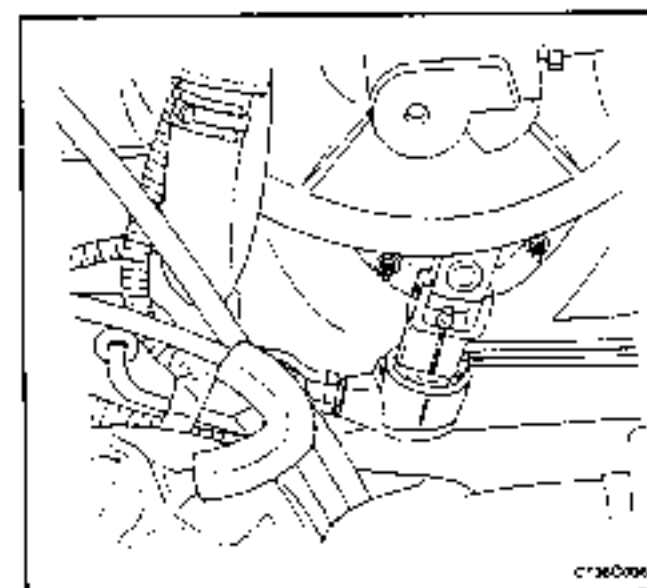
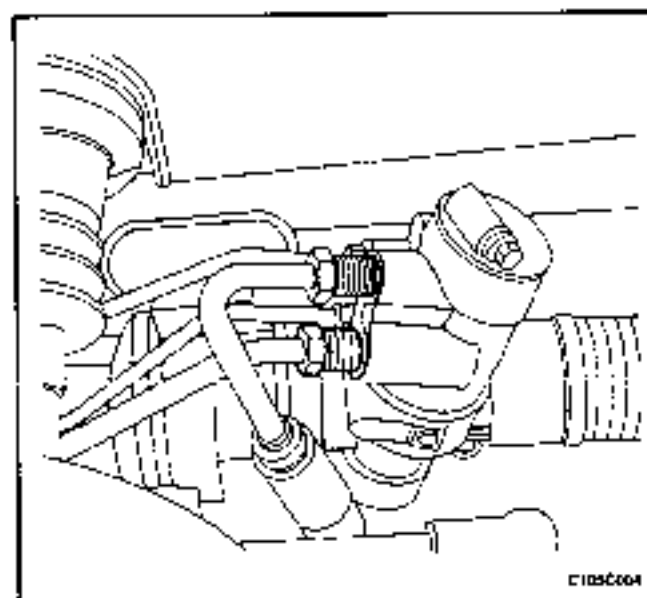
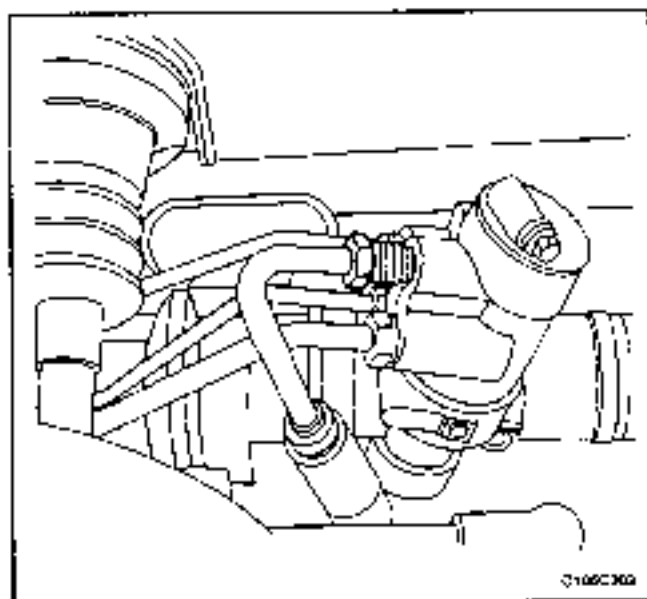
Step	Action	Value(s)	Yes	No
13	Repair the power feed to the ignition fuse F18. Is the repair complete?		System OK	-
14	1. Turn the ignition OFF. 2. Connect a test light from terminal 10 of the SSPS control module connector to B-. Is the test light on?	-	Go to Step 16	Go to Step 15
15	Repair the open in the ground circuit between terminal 10 of the SSPS control module connector and G201. Is the repair complete?	-	System OK	-
16	Check for a short to B+ or an open in the circuit between terminal 1 of the SSPS control module connector and terminal B of the EVO solenoid actuator connector. Is the connection faulty?	-	Go to Step 17	Go to Step 18
17	Repair the short to B+ or an open in the circuit between terminal 1 of the SSPS control module connector and terminal B of the EVO solenoid actuator connector. Is the repair complete?	-	System OK	-
18	1. Disconnect the steering wheel rotation sensor. 2. Turn the ignition ON. 3. Check for an open, short to ground, short to B+, or poor terminal contact between terminal 5 of the SSPS control module connector and terminal A of the steering wheel rotation sensor connector. Is the connection faulty?	-	Go to Step 19	Go to Step 20
19	Repair the open, short to ground, short to B+, or poor terminal contact between terminal 5 of the SSPS control module connector and terminal A of the steering wheel rotation sensor connector. Is the repair complete?	-	System OK	-
20	Check for an open between terminal 3 of the SSPS control module connector and terminal C of the steering wheel rotation sensor connector. Is the connection faulty?	-	Go to Step 21	Go to Step 22
21	Repair the open between terminal 3 of the SSPS control module connector and terminal C of the steering wheel rotation sensor connector. Is the repair complete?	-	System OK	-
22	Check for an open, short to ground, short to B+, or poor terminal contact between terminal 14 of the SSPS control module connector and terminal B of the steering wheel rotation sensor connector. Is the connection faulty?	-	Go to Step 23	Go to Step 24
23	Repair the open, short to ground, short to B+, or poor terminal contact between terminal 14 of the SSPS control module connector and terminal B of the steering wheel rotation sensor connector. Is the repair complete?	-	System OK	-

**SPEED SENSITIVE POWER STEERING SYSTEM  
OPERATING WITH FULL ASSIST AT ALL TIMES (Cont'd)**

Step	Action	Value(s)	Yes	No
24	1. Turn the ignition OFF. 2. Connect the SSPS control module. 3. Connect the steering wheel rotation sensor. 4. Turn the ignition ON. 5. Backprobe with a voltmeter from terminal 5 on the control module connector to the ground. 6. Rotate the steering wheel quickly in both directions. Does the voltage show an increase and decrease from the specified value?	~ 3 v	Go to Step 25	Go to Step 26
25	Replace the SSPS control module. Is the repair complete?	-	System OK	-
26	Replace the steering wheel rotation sensor. Is the repair complete?	-	System OK	-

**SPEED SENSITIVE POWER STEERING SYSTEM OPERATING WITH  
DECREASED ASSIST AT ALL TIMES**

Step	Action	Value(s)	Yes	No
1	Check the speedometer. Is speedometer inoperative?	-	Go to Section 5, Transaxle	Go to Step 2
2	Disconnect the FVO solenoid actuator at the power steering pump. Is the symptom still present?	-	Go to Section 6A, Power Steering System	Go to Step 3
3	Replace the speed sensitive power steering (SSPS) control module. Is repair complete?	-	System OK	-



## MAINTENANCE AND REPAIR ON-VEHICLE SERVICE

### RACK AND PINION ASSEMBLY (Left-Hand Drive Shown, Right-Hand Drive Shown)

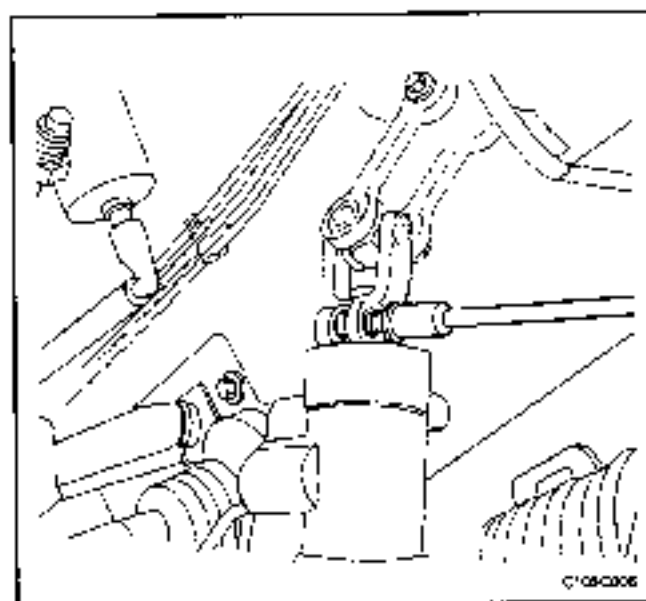
#### Tools Required

KM-507-B Ball Joint Remover

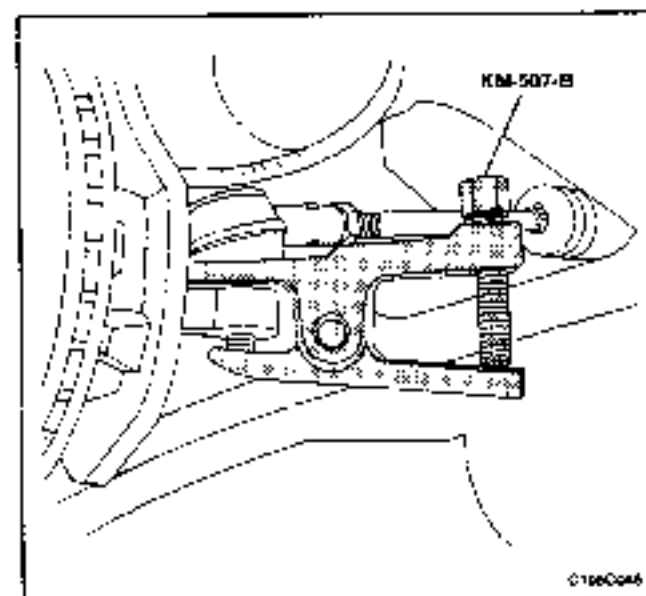
#### Removal Procedure

1. Disconnect the negative battery cable.
2. Raise and suitably support the vehicle.
3. Remove the wheels. Refer to *Section 2E, Tires and Wheels*.
4. Disconnect the power steering gear fluid outlet pipe. Place a drain pan under the steering gear to catch the power steering fluid.
5. Disconnect the power steering gear fluid inlet pipe.

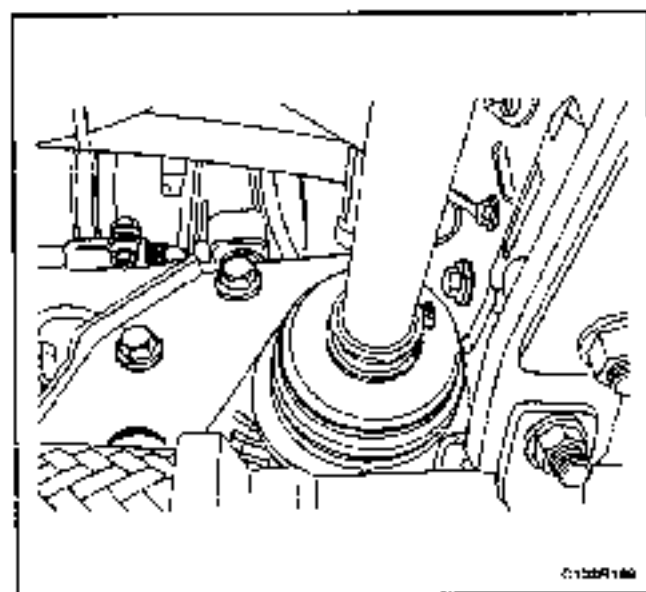
6. Position the steering gear straight ahead by turning the steering wheel until the steering wheel spokes are vertical and pointed to the left.
7. Scribe a mark on the stub shaft housing that lines up with a mark on the intermediate shaft lower coupling.



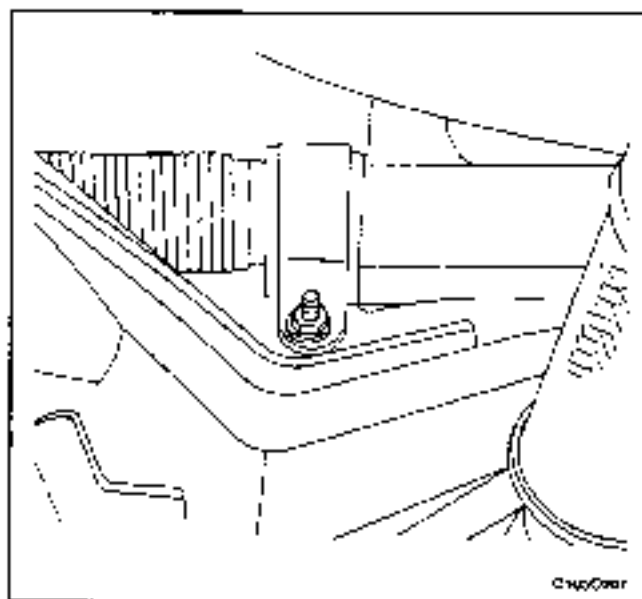
8. Remove the intermediate shaft pinch bolt.



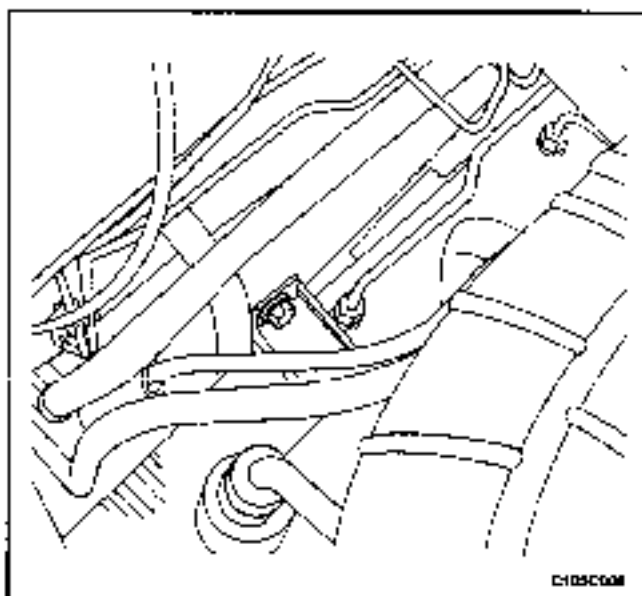
9. Remove the outer tie rod nuts and disconnect the tie rod ends from the strut assembly using the ball joint remover KM-507-B.



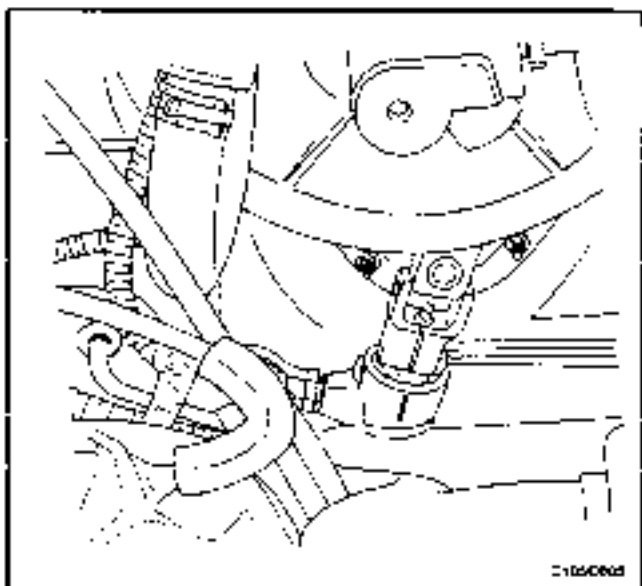
10. Remove the center member. Refer to Section 3N, Frame and Underbody.
11. On vehicles equipped with an automatic transaxle, remove the transaxle center bracket. Refer to Section 5A, ZF 4 HP 14 Automatic Transaxle.
12. On vehicles equipped with a manual transaxle, remove the bolts securing the transaxle center bracket to the transaxle and the engine. Move the transaxle center bracket out of the way.



13. Remove the nuts from the steering gear mounting bracket



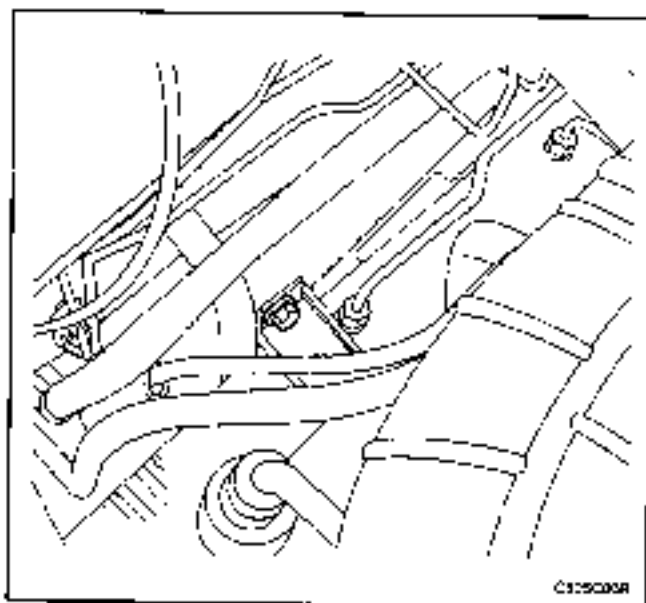
14. Remove the bolts from the steering gear mounting brackets.
15. Disconnect the rack and pinion assembly from the mounts and move it to the right. Bring the assembly out of the vehicle from below.



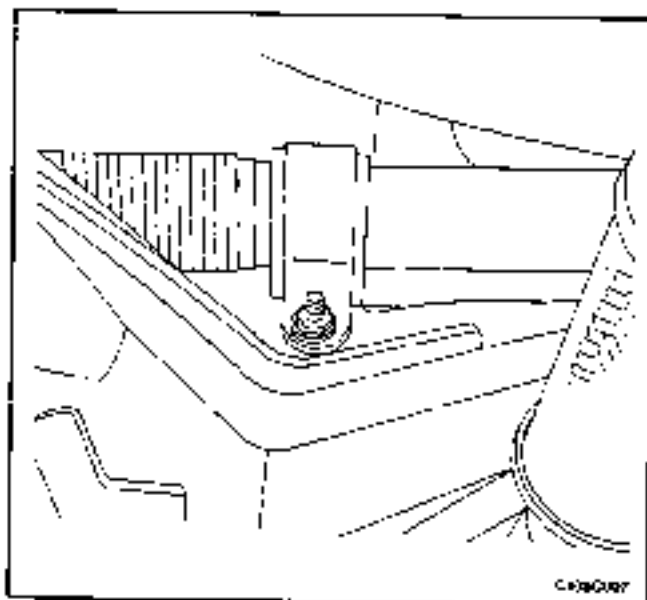
### Installation Procedure

1. Install the rack and pinion assembly from below. The steering gear must be in a straight-ahead position, and the steering wheel spokes must be vertical and pointing to the left. Align the marks on the shafts to ensure proper positioning. Seat the stub shaft into the intermediate shaft.





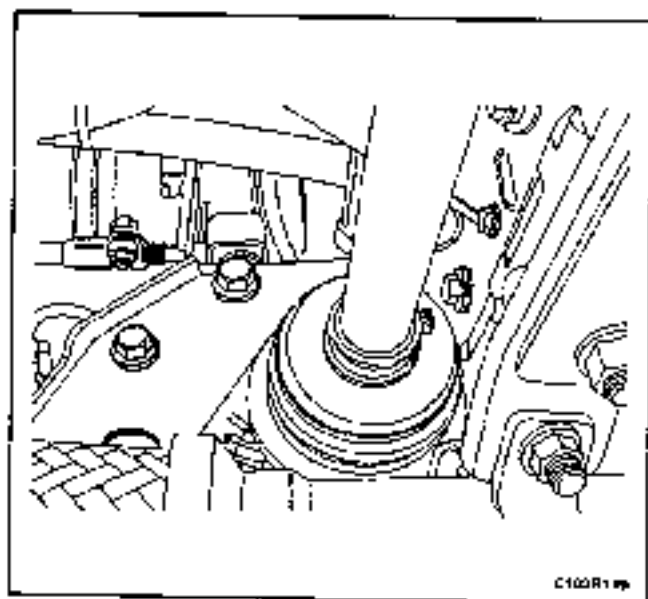
2. Install the bolts on the upper part of the steering gear mounting bracket.



3. Install the nuts on the lower part of the steering gear mounting bracket.

#### **Tighten**

Tighten the steering gear mounting bracket bolts and nuts to 60 N·m (44 lb-ft).



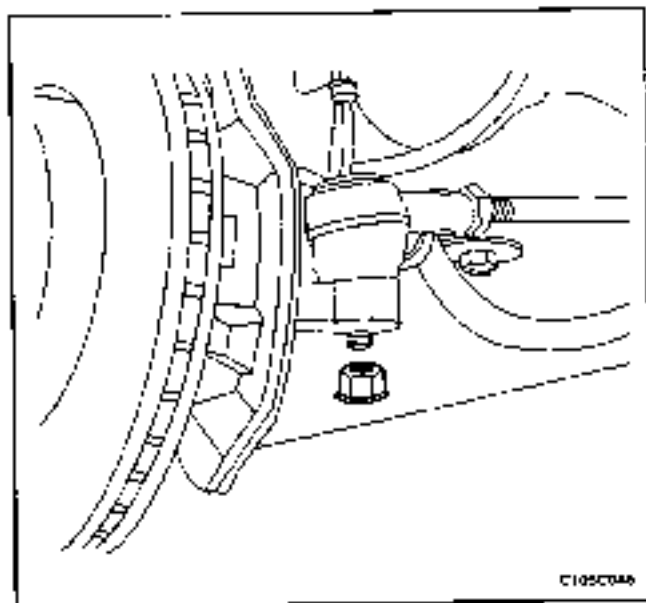
4. On vehicles equipped with a manual transaxle, position the transaxle center bracket in place and install the bolts securing the bracket to the engine and the transaxle.

#### **Tighten**

Tighten the transaxle center bracket-to-transaxle bolts and the transaxle center bracket-to-engine bolt to 90 N·m (66 lb-ft).

5. On vehicles equipped with an automatic transaxle, install the transaxle center bracket. Refer to Section 5A, ZF 4 HP 14 Automatic Transaxle.
6. Install the center member. Refer to Section 9N, Frame and Underbody

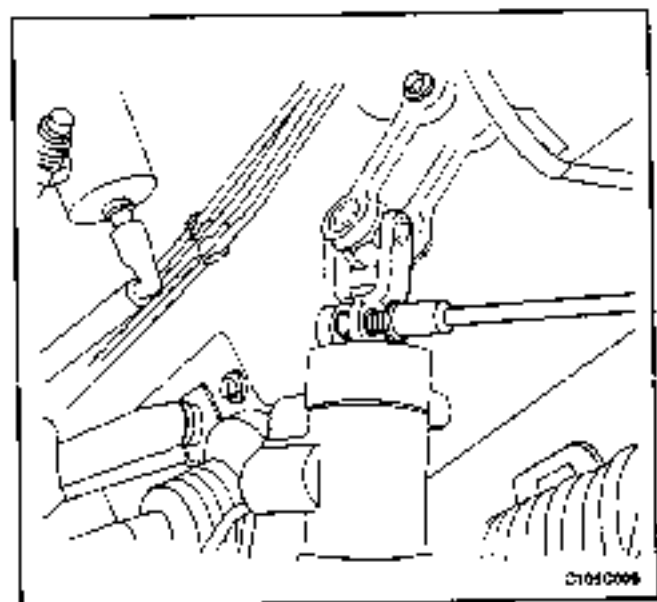
## 6C-14 POWER STEERING GEAR



7. Connect the tie rod ends to the strut assembly.
8. Install the outer tie rod nuts.

### Tighten

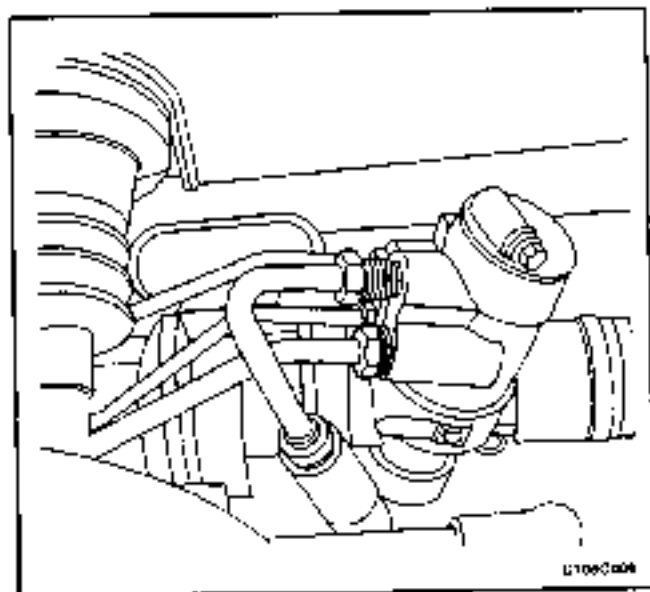
Tighten the outer tie rod nuts to 50 N•m (37 lb-ft).



9. Install the lower intermediate shaft pinch bolt.

### Tighten

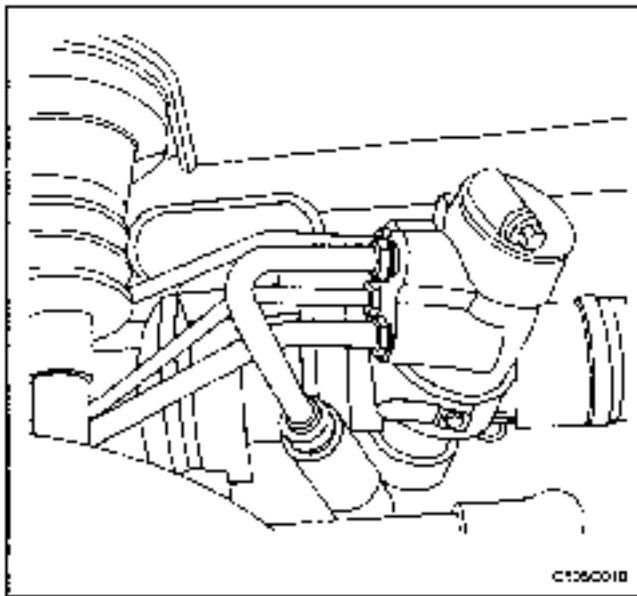
Tighten the lower intermediate shaft pinch bolt to 25 N•m (18 lb-ft).



10. Connect the power steering gear fluid inlet pipe.

### Tighten

Tighten the steering gear inlet pipe fitting to 28 N•m (21 lb-ft).



11. Connect the power steering gear fluid outlet pipe.

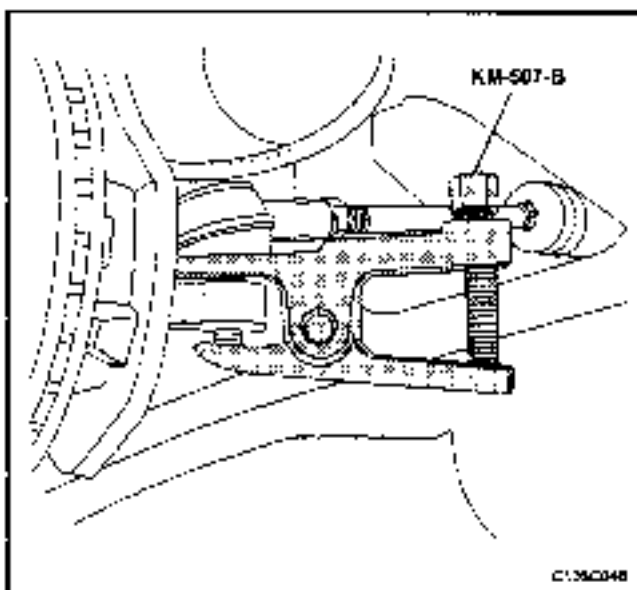
#### Tighten

Tighten the steering gear outlet pipe fitting to 28 N·m (21 lb-ft).

12. Install the wheels. Refer to *Section 2E, Tires and Wheels*.
13. Lower the vehicle.
14. Do a straight-ahead check. Refer to 'Straight-Ahead Check' in this section.

**Notice:** When adding fluid or making a complete fluid change always use power steering fluid DEXRON<sup>®</sup> II or III or equivalent. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

15. Refill the power steering system and check for leaks. If leaks are found, correct the cause of the leak and bleed the system. Refer to *Section 6A, Power Steering System*.
16. Connect the negative battery cable.



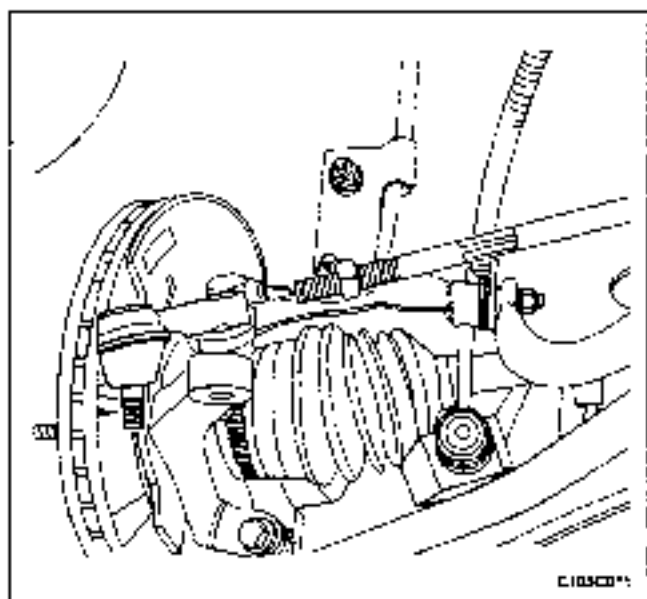
## OUTER TIE ROD

#### Tools Required

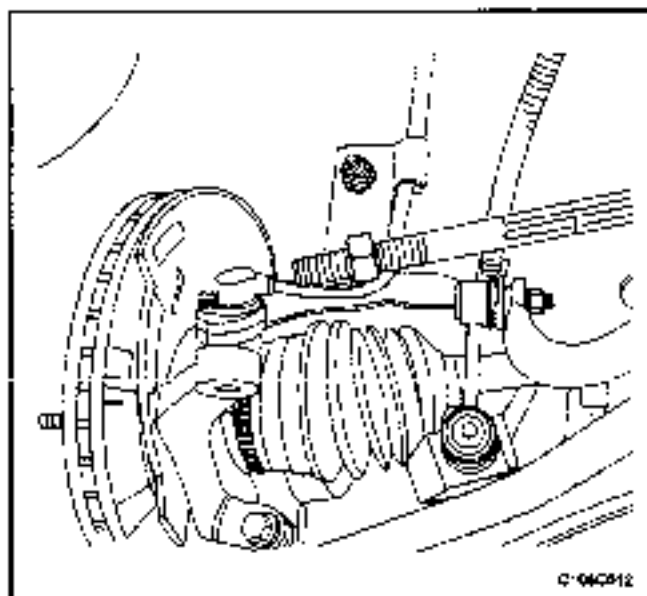
KM-507-B Ball Joint Remover

#### Removal Procedure

1. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
2. Mark the threads on the inner tie rod to aid in repositioning the adjusting nut.
3. Remove the outer tie rod nut and disconnect the outer tie rod from the steering knuckle using the ball joint remover KM-507-B.

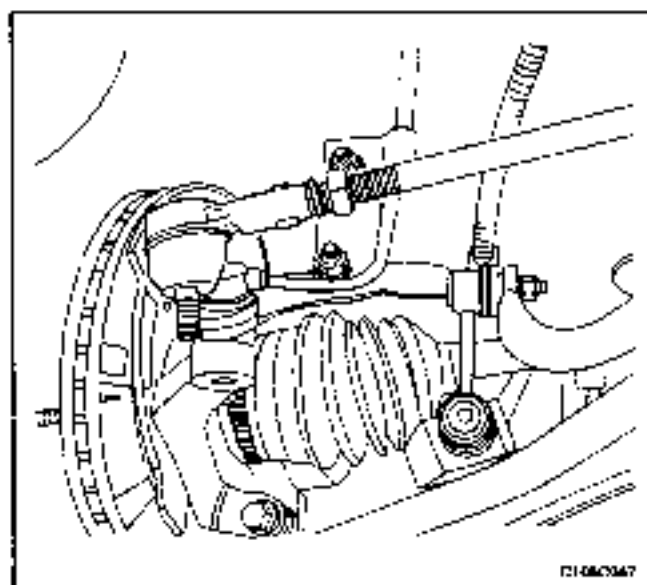


4. Loosen the outer tie rod adjusting nut and remove the outer tie rod by twisting it off the inner tie rod.

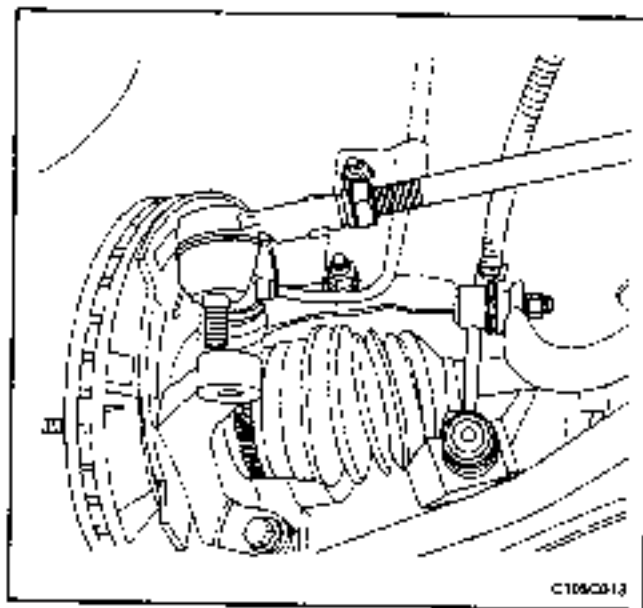


### Installation Procedure

1. Reposition the adjusting nut to the marks on the inner tie rod.



2. Install the outer tie rod by twisting it onto the inner tie rod.

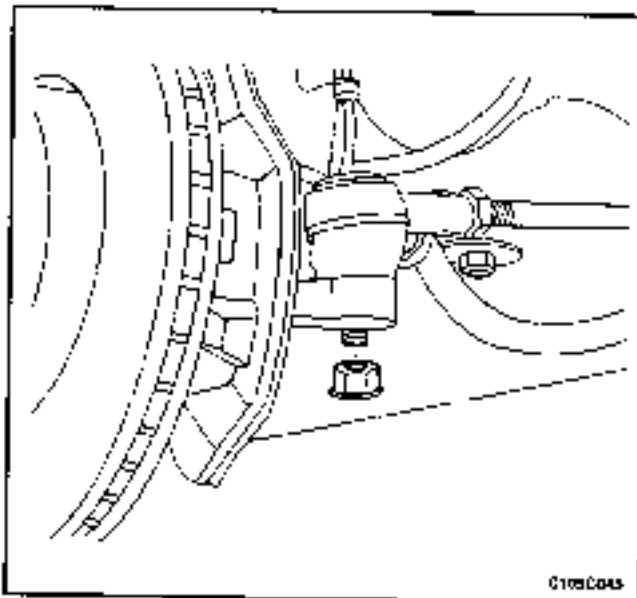


C105C013

3. Connect the outer tie rod to the steering knuckle.
4. Perform a front toe adjustment. Refer to Section 2B, *Wheel Alignment*.
5. Tighten the adjusting nut.

#### **Tighten**

Tighten the outer tie rod adjusting nut to 64 N·m (47 lb-ft).



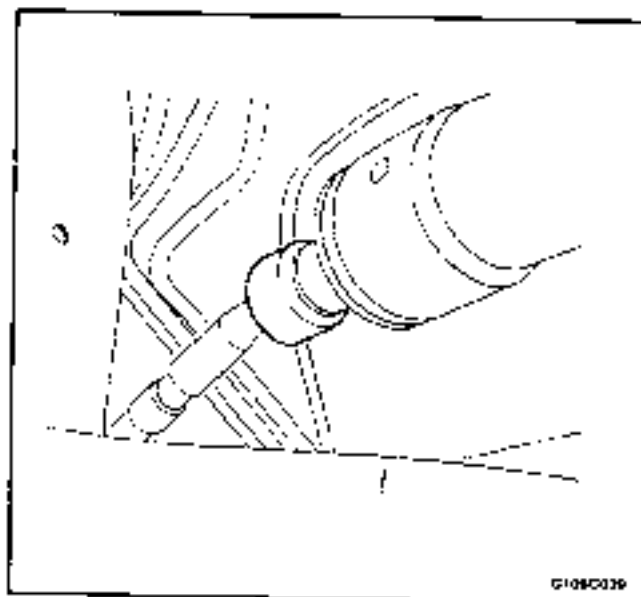
C105C045

6. Install the outer tie rod nut.

#### **Tighten**

Tighten the outer tie rod nut to 50 N·m (37 lb-ft).

7. Install the wheel. Refer to Section 2E, *Tires and Wheels*.

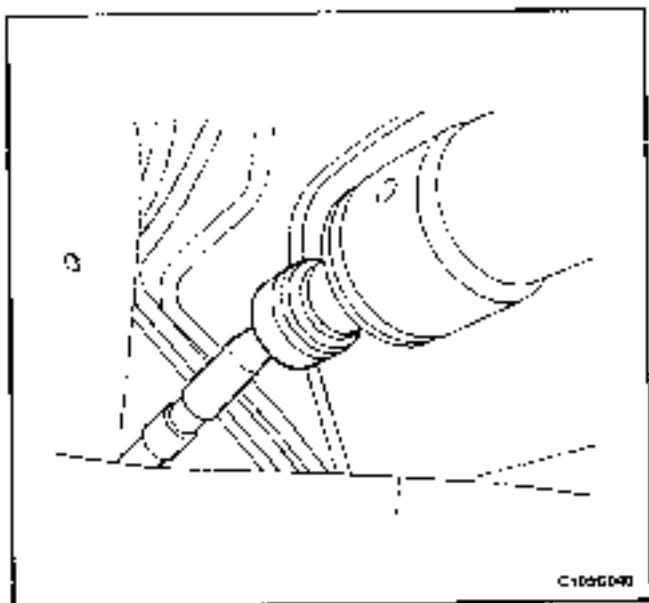


C105C029

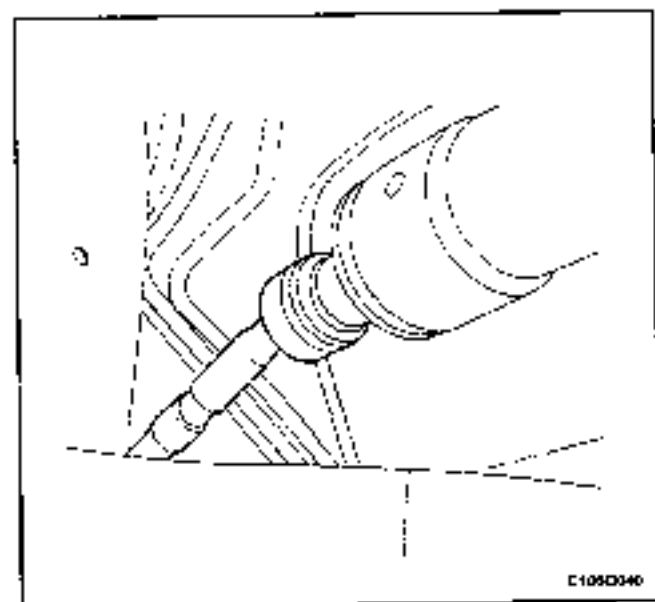
## **INNER TIE ROD**

### **Removal Procedure**

1. Raise and suitably support the vehicle.
2. Remove the wheel. Refer to Section 2E, *Tires and Wheels*.
3. Remove the outer tie rod. Refer to "Outer Tie Rod" in this section.
4. Remove the dust boot. Refer to "Dust Boot" in this section.
5. Push back the plastic retainer protecting the connection between the inner tie rod and the power steering gear rack.



6. Remove the inner tie rod.



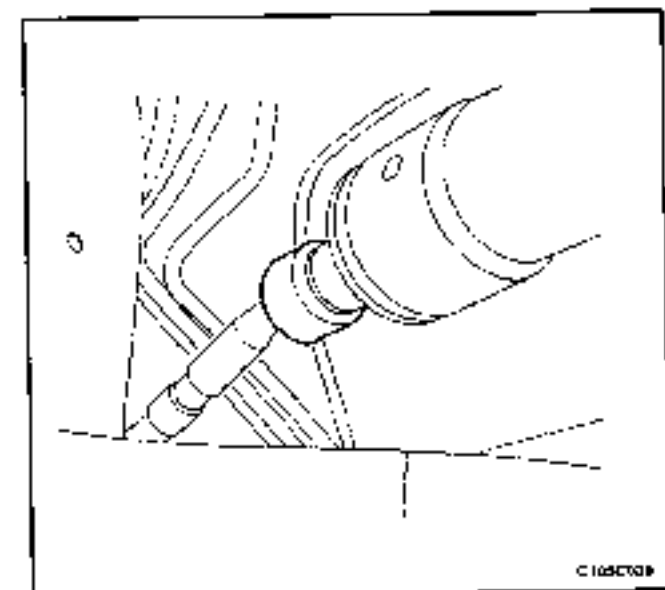
### Installation Procedure

**Important:** The right and left inner tie rods are unequal in length. Be sure to install the correct inner tie rod on the proper side of the power steering gear.

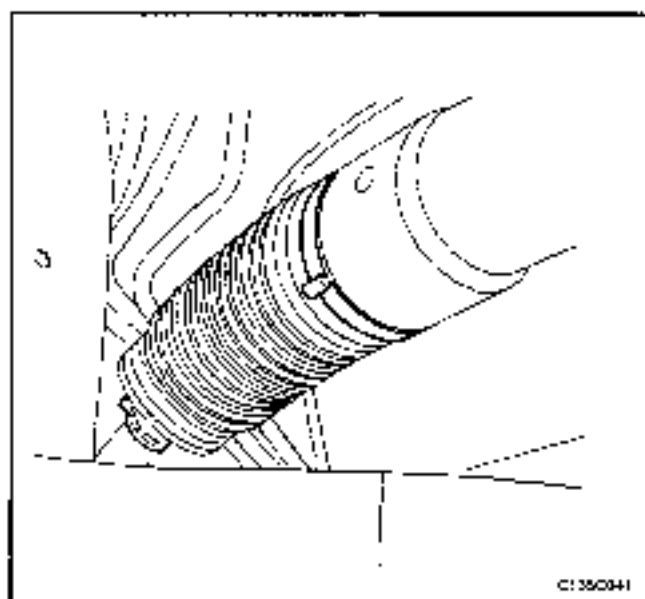
1. Install the inner tie rod.

#### Tighten

Tighten the inner tie rod to 100 N•m (74 lb-ft).



2. Push the plastic retainer over the tie rod.
3. Install the dust boot. Refer to "Dust Boot" in this section.
4. Install the outer tie rod. Refer to "Outer Tie Rod" in this section.
5. Install the wheel. Refer to *Section 2E, Tires and Wheels*.
6. Lower the vehicle.



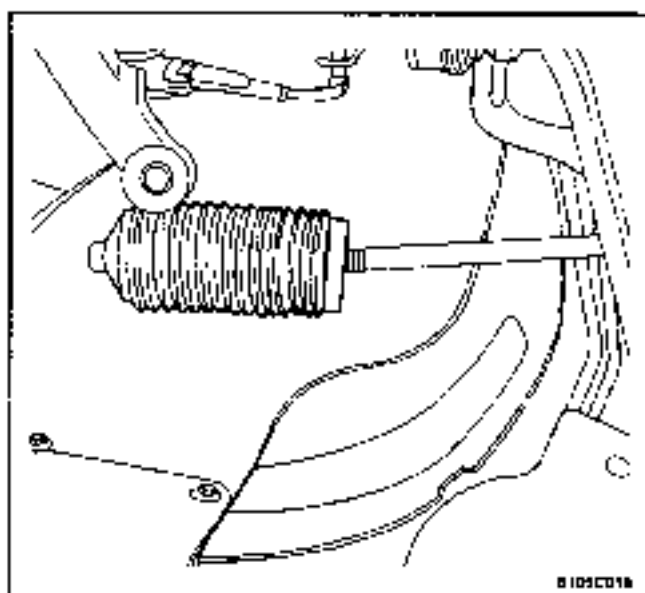
## DUST BOOT

### Tools Required

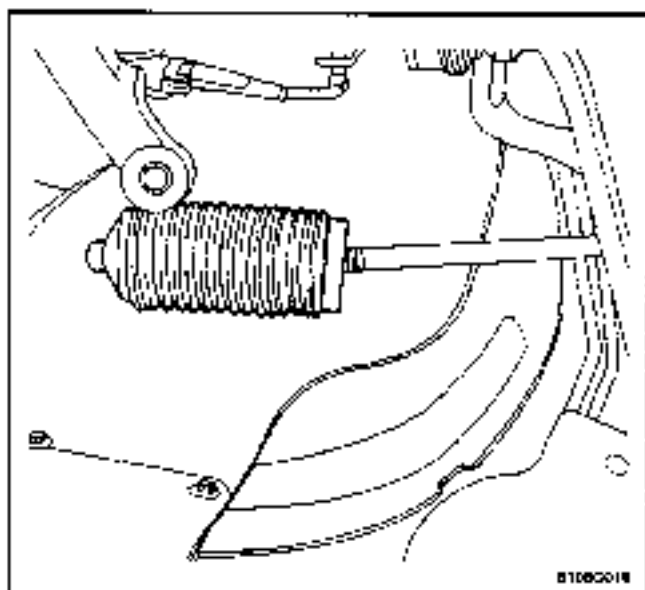
KM-J-22610 Installer

### Removal Procedure

1. Raise and suitably support the vehicle.
2. Remove the wheel. Refer to Section 2E, *Tires and Wheels*.
3. Remove the outer tie rod. Refer to "Outer Tie Rod" in this section.
4. Remove the dust boot retaining clamps.

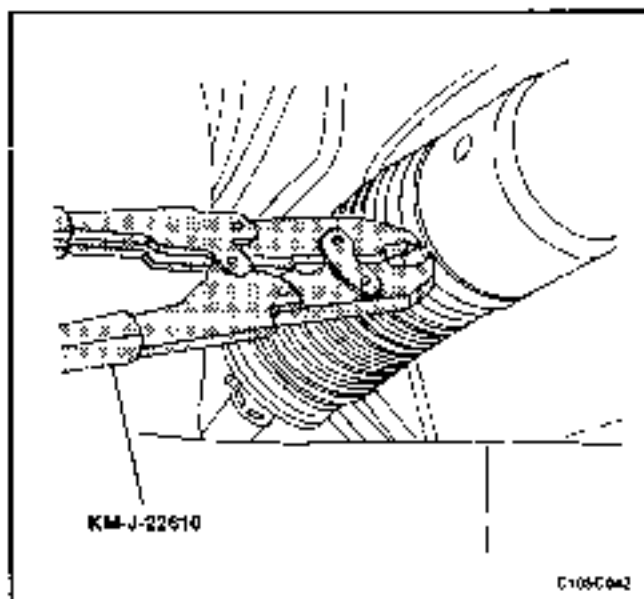


5. Remove the dust boot.

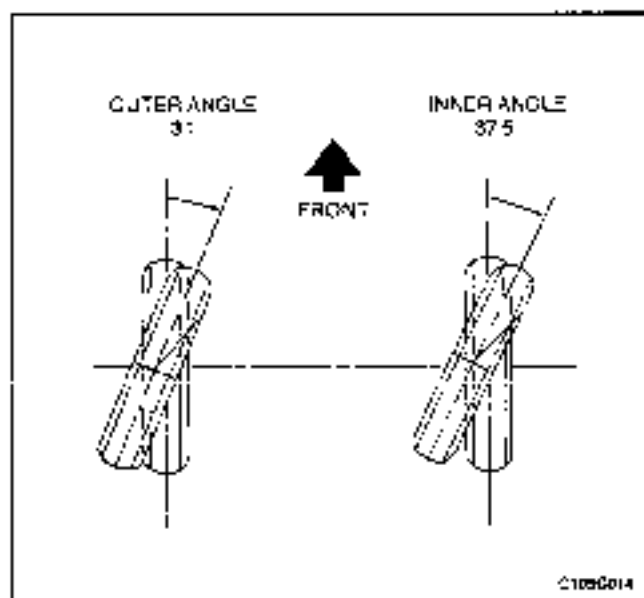


### Installation Procedure

1. Install the dust boot.



- 2 Install the tie rod end dust boot retaining clamp. Install the cylinder end dust boot retaining clamp with the installer KM-J-22610.
- 3 Install the outer tie rod. Refer to "Outer Tie Rod" in this section.
- 4 Install the wheel. Refer to Section 2E, Tires and Wheels.
- 5 Lower the vehicle.



### STRAIGHT-AHEAD CHECK

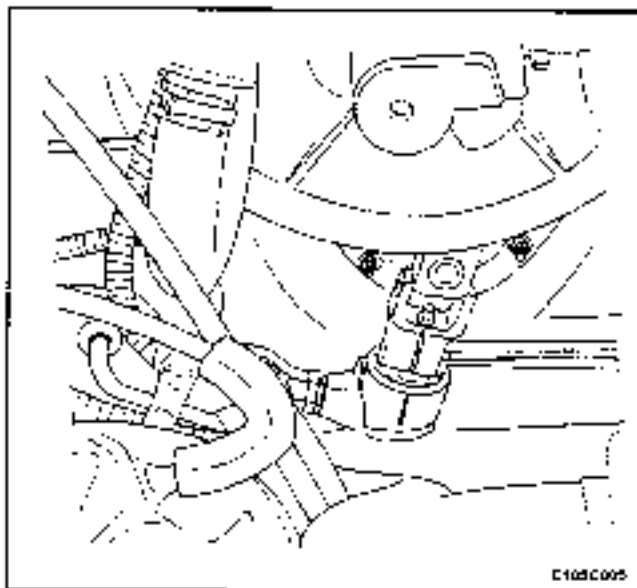
After all the necessary operations on the steering gear are completed (removing and installing, disassembling and assembling), check the exact straight-ahead position of the steering in each case.

With the vehicle on the floor, place the steering wheel in the straight-ahead position. Mark the centerline of both tires on the floor. Turn the steering wheel all the way to the right and mark the new centerline of both tires on the floor.



Straight-Ahead Check Table

Step	Action	Value(s)	Yes	No
1	Place the steering wheel in the straight-ahead position. Is the wheel in the correct position?	-	Go to Step 2	-
2	Is the lower intermediate shaft pinch bolt lying parallel to the steering gear?		Go to Step 3	Go to Step 4
3	Is the steering wheel off center by more than 5 degrees?	-	Go to Step 5	Go to Step 6
4	The pinion is displaced on the rack. The steering pinion position must be corrected. Is the repair complete?	-	Go to Step 2	-
5	Remove steering wheel and center on the spindle splines. Is the repair complete?	-	Go to Step 3	-
6	Turn the steering wheel all the way to the right. Measure the inner and the outer angles of the tire centerline compared to the straight-ahead centerline. Are the angles within specifications?	Inner angle: 37.5° Outer angle: 31°	System OK	Go to Step 7
7	The rack assembly was not assembled correctly. Repair as needed. Is the repair complete?	-	Go to Step 6	-



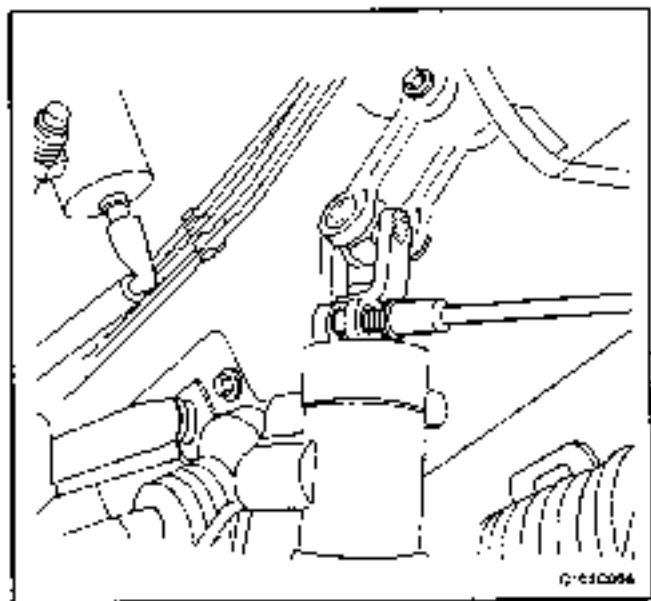
## INTERMEDIATE SHAFT AND DASH SEAL

(Left-Hand Drive Shown. Right-Hand Drive Similar)

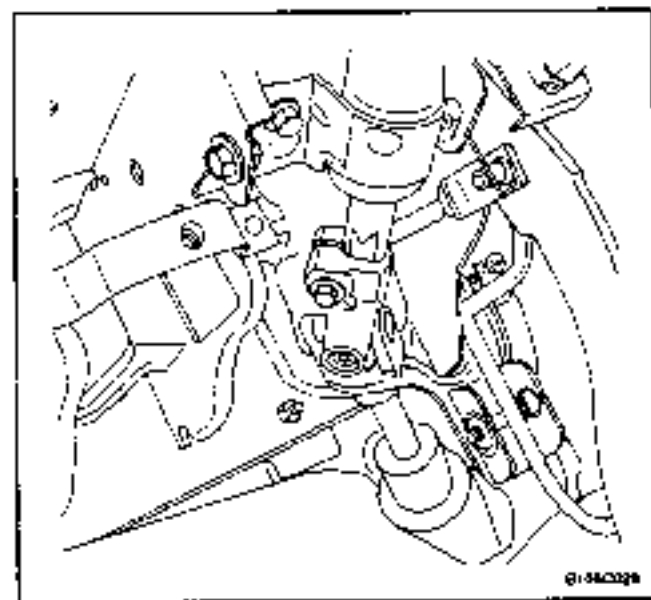
### Removal Procedure

1. Turn the steering wheel until it is horizontal, with the spokes pointing down. This is the straight-ahead position. Make a mark on the stub shaft housing that lines up with a mark on the intermediate shaft lower universal joint. This mark will be used for proper alignment during installation.

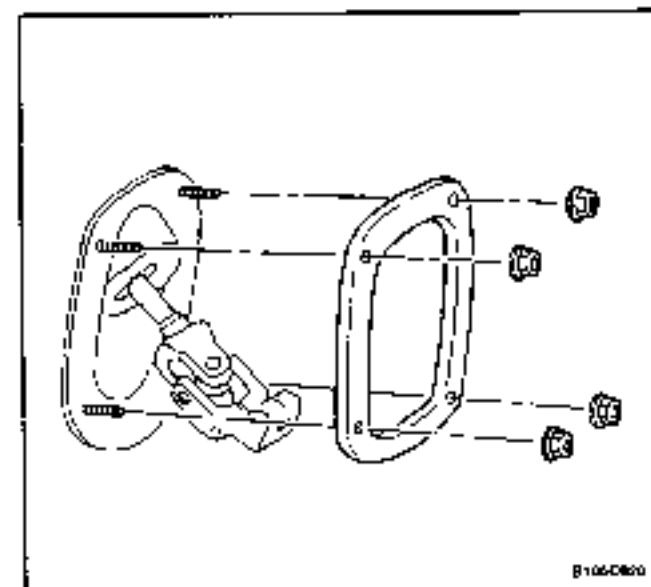
## 6C-22 POWER STEERING GEAR



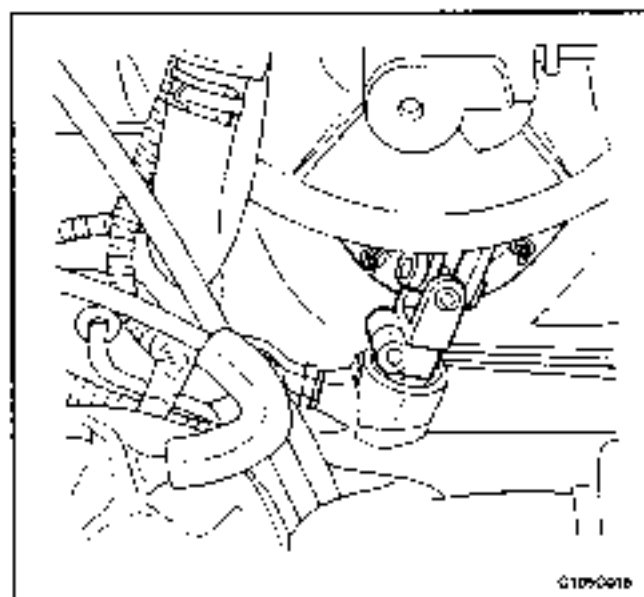
2. Remove the lower pinch bolt from the universal joint on the intermediate shaft.



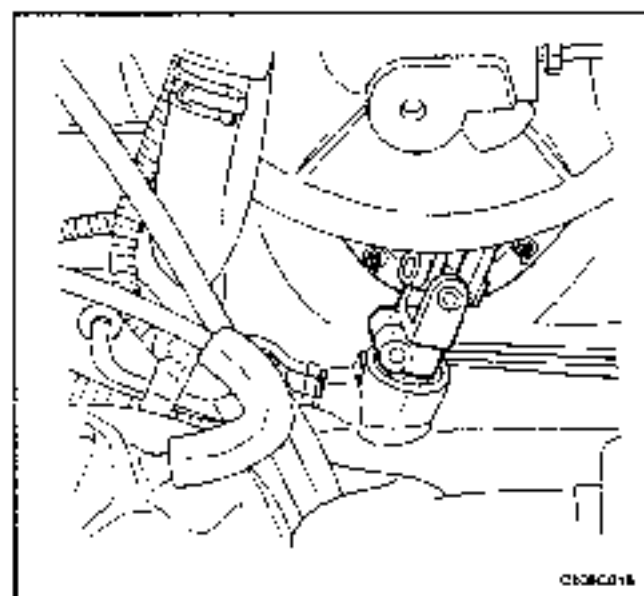
3. Turn the steering wheel so that the upper pinch bolt is accessible. Remove the upper pinch bolt from the universal joint on the intermediate shaft.



4. Remove the nuts from the dash seal retaining ring and remove the dash seal retaining ring.

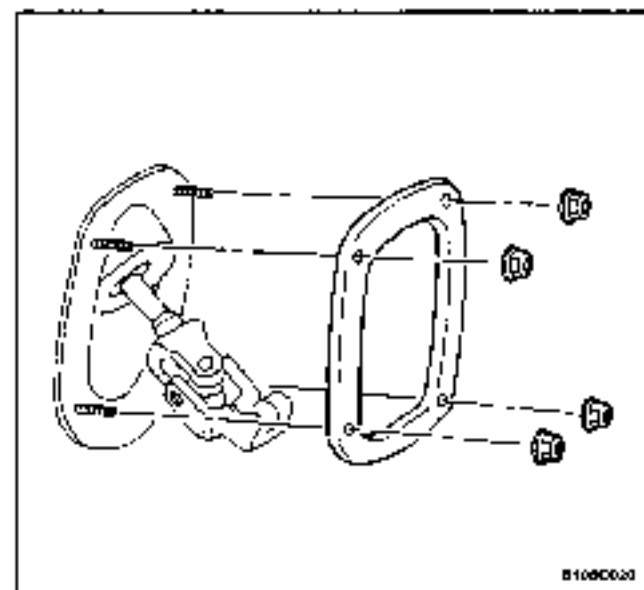


- 5 Remove the coupling from the power steering gear and pull the intermediate shaft out of the engine compartment.



### Installation Procedure

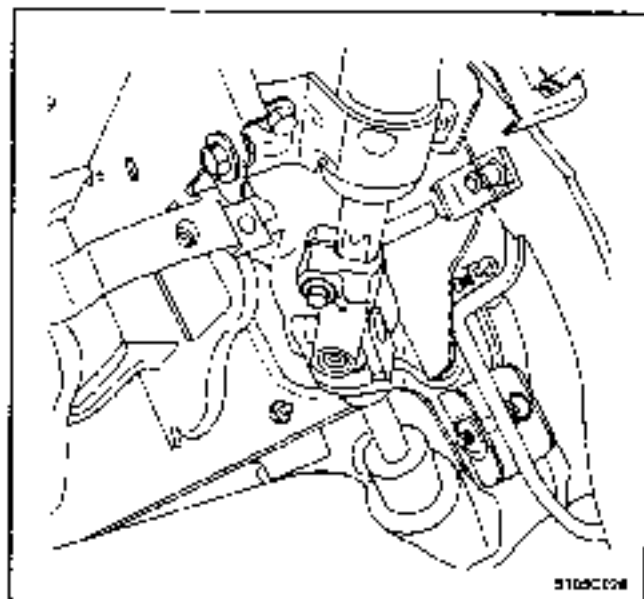
1. Install the intermediate shaft into the vehicle.



2. Install the dash seal retaining ring with the nuts.

### Tighten

Tighten the dash seal retaining ring nuts to 7 N•m (62 lb•in).

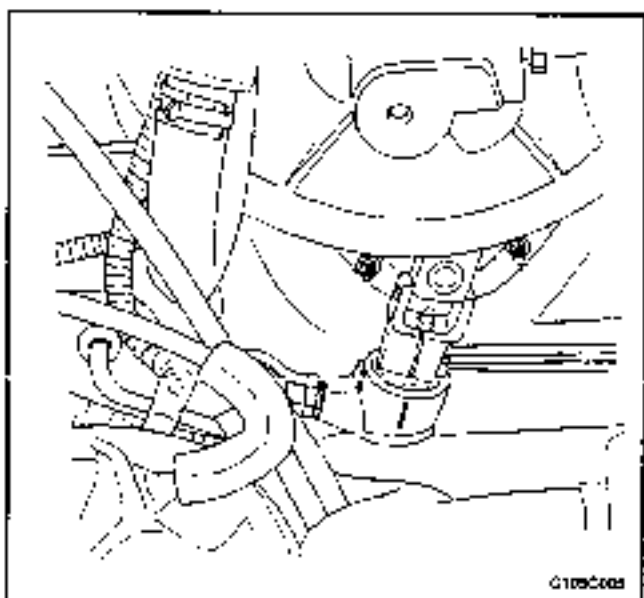


**Important:** When attaching the upper universal joint, the steering wheel must be placed in the straight-ahead position with the spokes pointing down.

3. Attach the upper universal joint of the intermediate shaft onto the steering column.
4. Install the pinch bolt into the upper universal joint on the intermediate shaft and tighten the bolt.

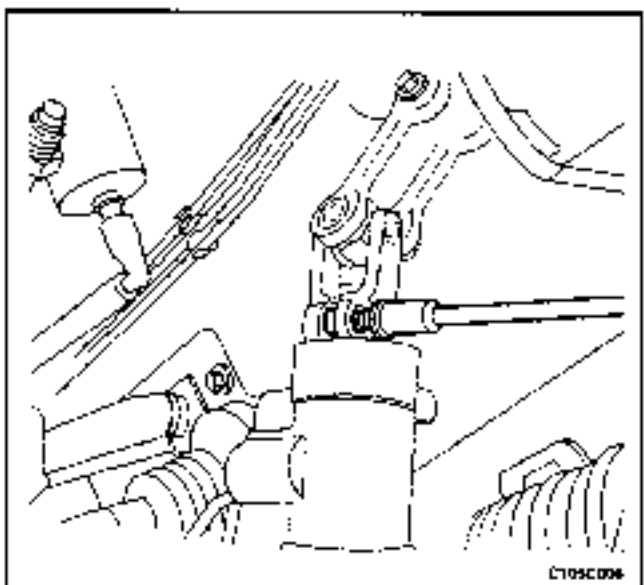
**Tighten**

Tighten the upper intermediate shaft pinch bolt to 22 N·m (16 lb-ft).



**Important:** When attaching the lower universal joint, the marks on the intermediate shaft and on the stub shaft should line up.

5. Attach the lower universal joint of the intermediate shaft onto the steering gear stub shaft.

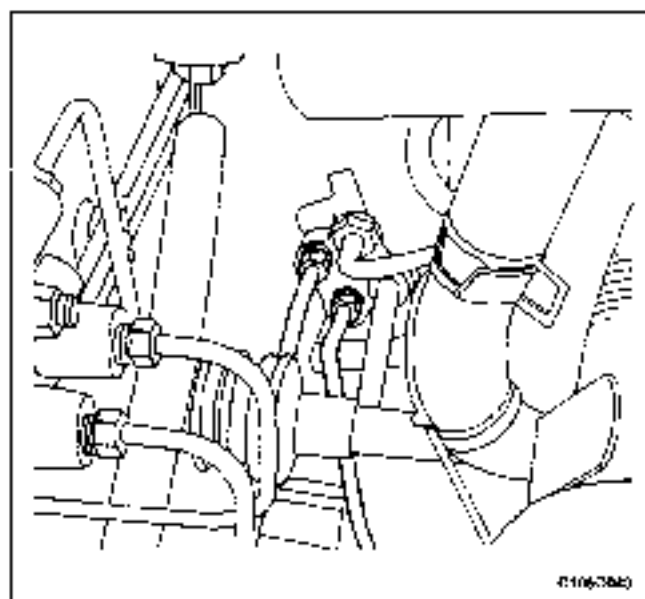


**Important:** When installing the lower intermediate shaft pinch bolt, make sure the bolt goes through the universal joint on the side of the stub shaft with the notch. If you have trouble seating the universal joint completely down onto the stub shaft, rotate the steering wheel slightly while pushing down on the universal joint.

6. Install the bolt into the lower universal joint on the intermediate shaft and tighten the bolt.

**Tighten**

Tighten the lower intermediate shaft pinch bolt to 22 N·m (16 lb-ft).

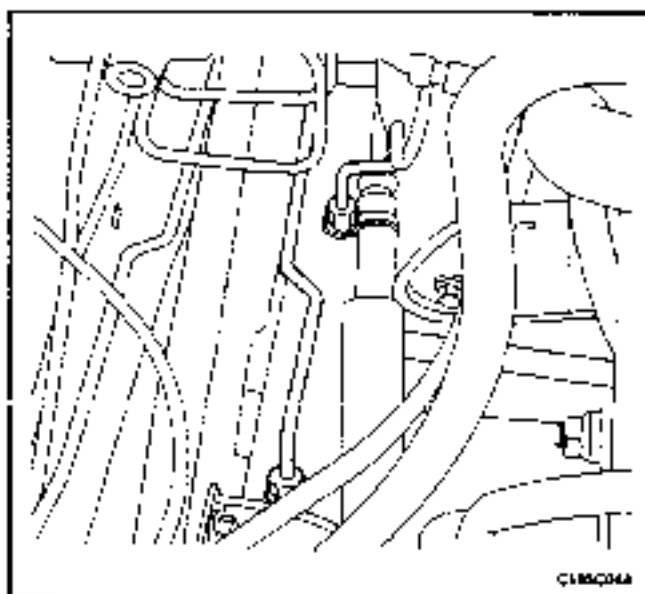


## HYDRAULIC CYLINDER LINES

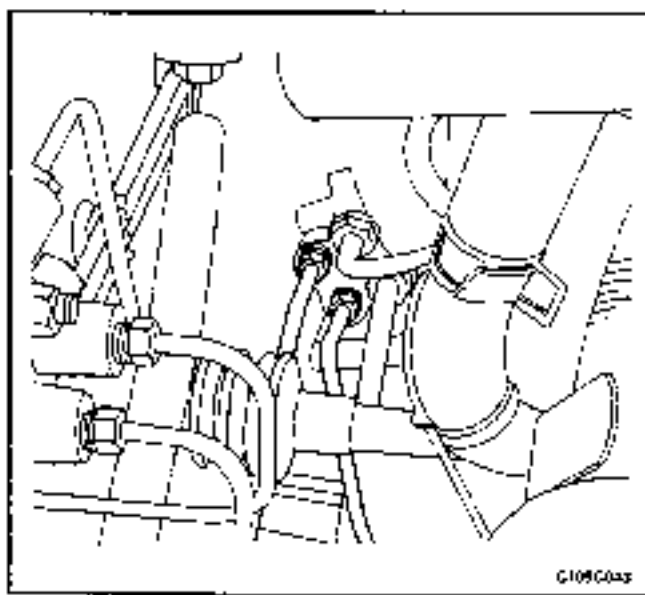
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Siphon the power steering fluid from the fluid reservoir.
2. Raise and suitably support the vehicle.
3. Disconnect the power steering gear hydraulic cylinder pipes from the power steering gear at the valve end. Replace the O-ring seals as needed.



4. Disconnect the power steering gear hydraulic cylinder pipes from the power steering gear at the cylinder end.
5. Remove the steering gear hydraulic cylinder pipes from the vehicle.

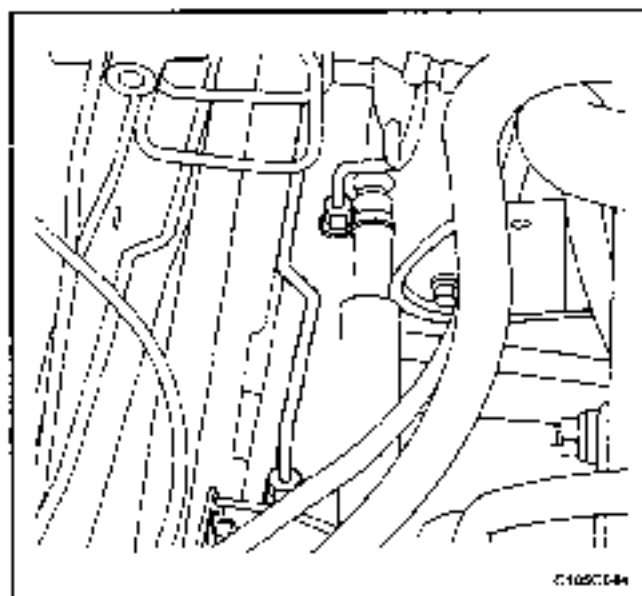


### Installation Procedure

1. Lubricate any new O-ring seals with power steering fluid.
2. Place the O-ring seals into the housing and install the steering gear hydraulic cylinder pipes.
3. Connect the power steering gear hydraulic cylinder pipes to the power steering gear at the valve end.

### Tighten

Tighten the hydraulic cylinder line fittings at the valve end to 18 N·m (13 lb-ft).



4. Connect the power steering gear hydraulic cylinder pipes to the power steering gear at the cylinder end

**Tighten**

Tighten the hydraulic cylinder line fittings at the cylinder end to 27 N•m (20 lb-ft)

5. Lower the vehicle.

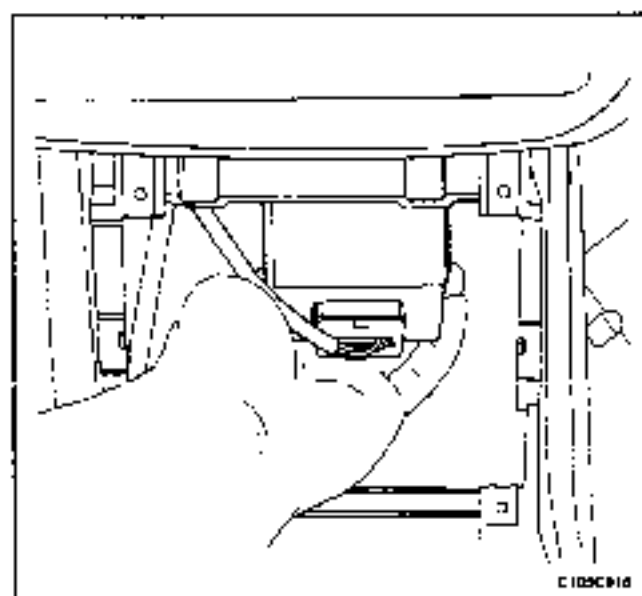
**Notice:** When adding fluid or making a complete change, always use DEXRON®-III power steering fluid. Failure to use the proper fluid will cause hose and seal damage and fluid leaks.

6. Fill the fluid reservoir with power steering fluid.
7. Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to "Bleeding the Power Steering System" in this section.

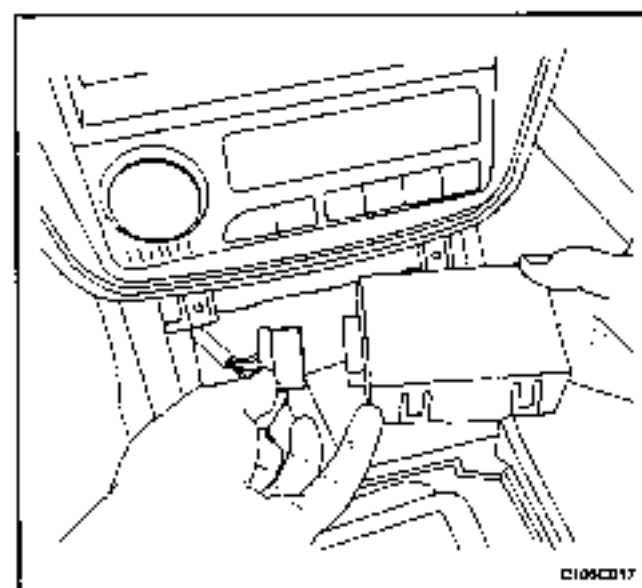
**SPEED SENSITIVE POWER STEERING CONTROL MODULE**

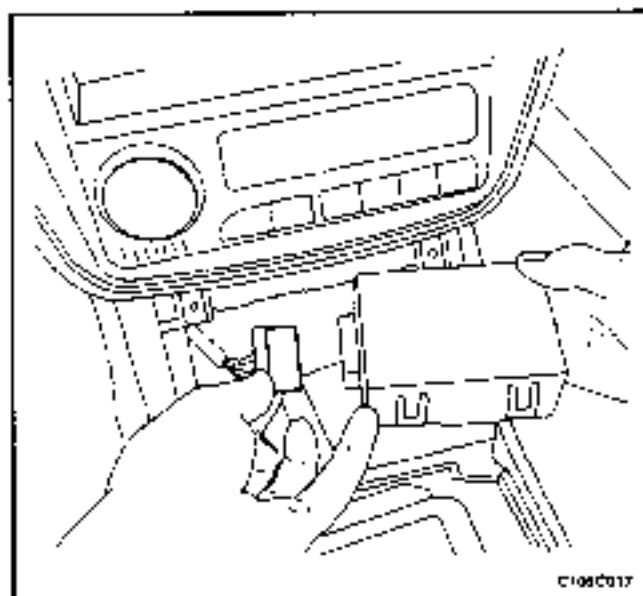
**Removal Procedure**

1. Disconnect negative battery cable.
2. Remove the ashtray. Refer to Section SE, Instrumentation/Driver Information.
3. Slide the speed sensitive power steering (SSPS) control module off the control module bracket.



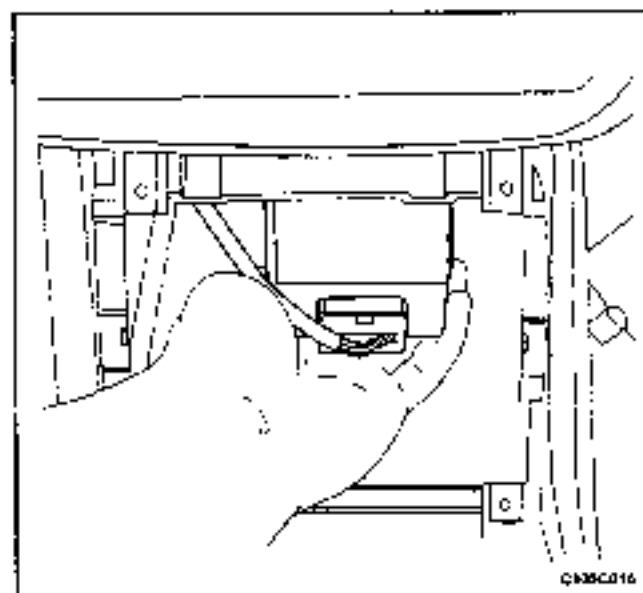
4. Disconnect the electrical connector from the SSPS control module





### Installation Procedure

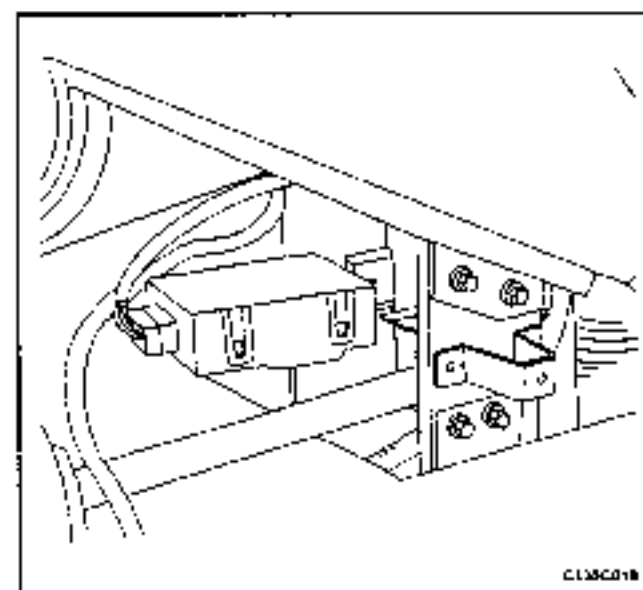
1. Connect the electrical connector to the SSPS control module.
2. Slide the SSPS control module onto the SSPS control module bracket.
3. Install the ashtray. Refer to Section 9G, Interior Trim.
4. Connect the negative battery cable.

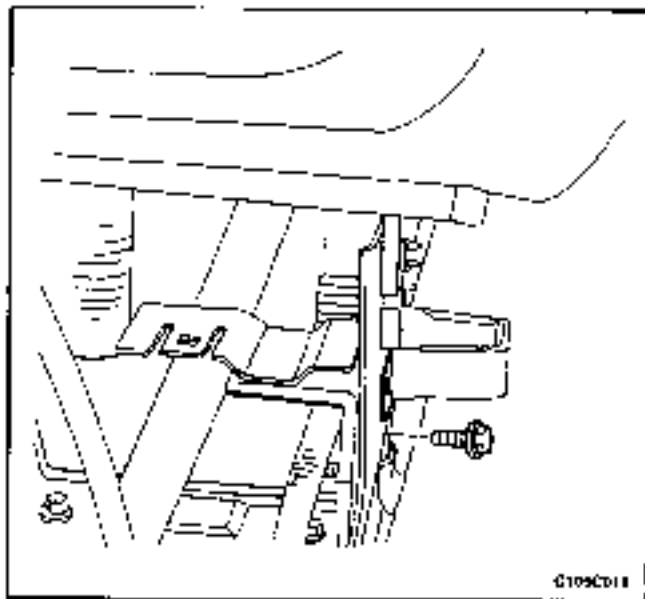


### SPEED SENSITIVE POWER STEERING CONTROL MODULE BRACKET

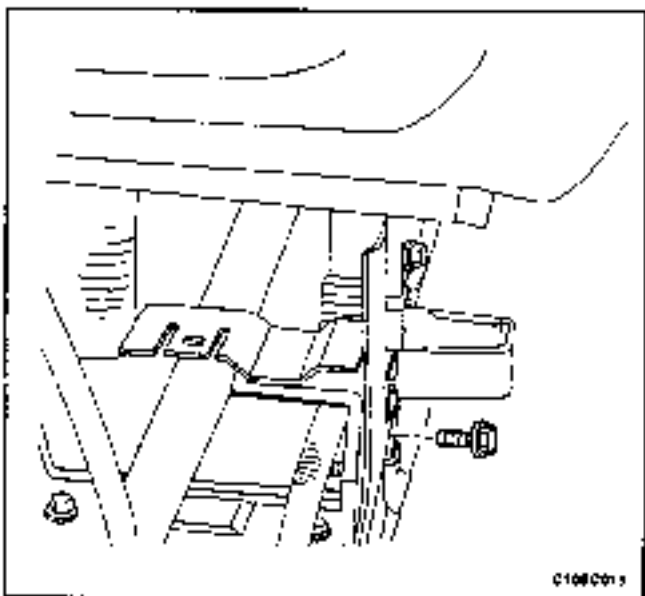
#### Removal Procedure

1. Disconnect negative battery cable.
2. Remove the floor console. Refer to Section 9G, Interior Trim.
3. Slide the speed sensitive power steering (SSPS) control module off the control module bracket.





4. Remove the SSPS control module bracket bolts and remove the control module bracket.

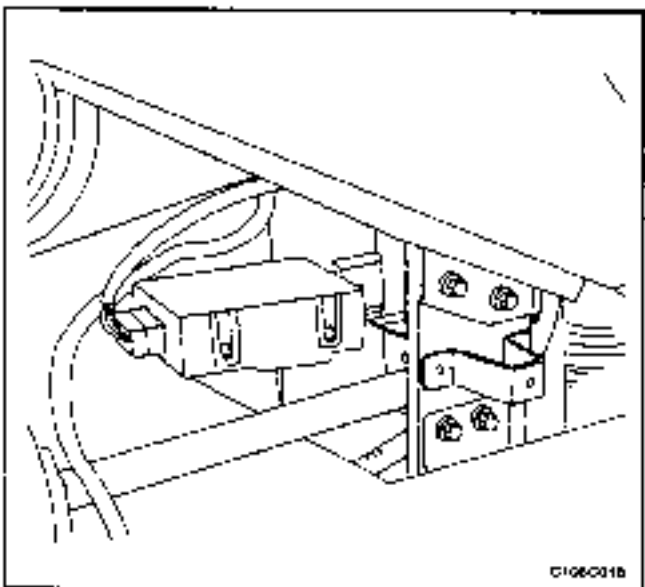


### Installation Procedure

1. Install the SSPS control module bracket and the control module bracket bolts.

### Tighten

Tighten the SSPS control module bracket bolts to 7 N•m (62 lb-in).



2. Slide the SSPS control module onto the control module bracket.
3. Install the floor console. Refer to Section 9G, *Interior Trim*.
4. Connect the negative battery cable.



## UNIT REPAIR

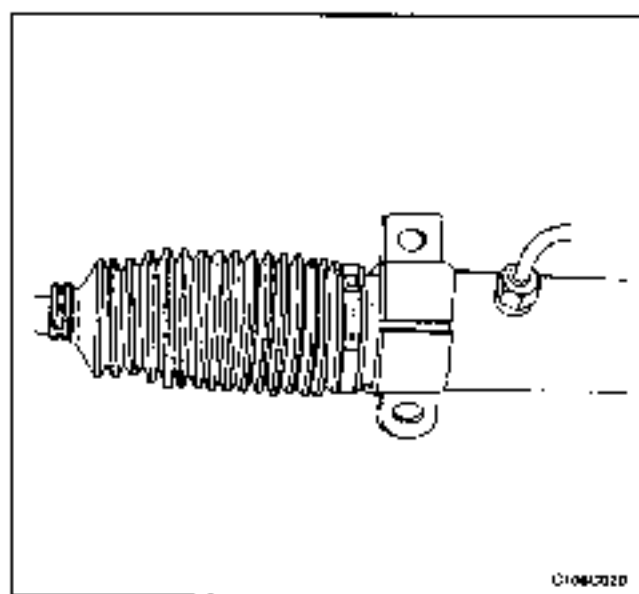
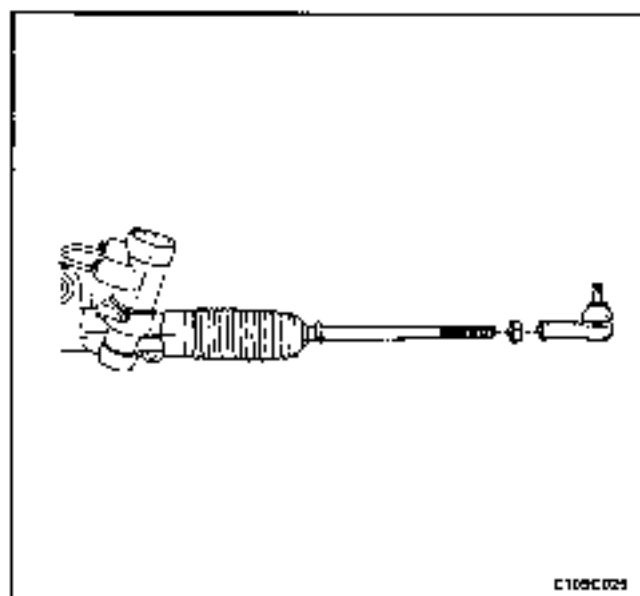
### RACK AND PINION

#### Tools Required

KM-J-22610 Instafler

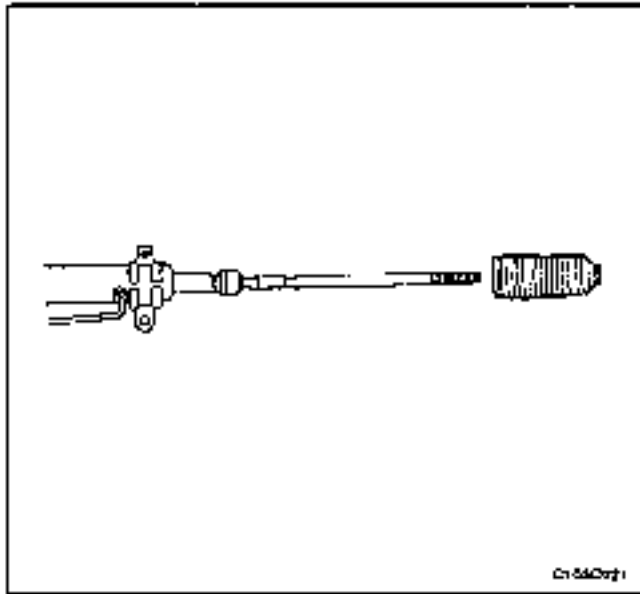
#### Disassembly Procedure

1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Remove the valve and pinion assembly from the rack and pinion steering assembly. Refer to "Valve and Pinion" in this section.
3. Remove the rack bearing assembly from the rack and pinion steering assembly. Refer to "Rack Bearing" in this section.
4. Mark the threads on the inner tie rod to aid in repositioning the adjusting nut.
5. Loosen the adjusting nut and remove the outer tie rod nut and the adjusting nut.

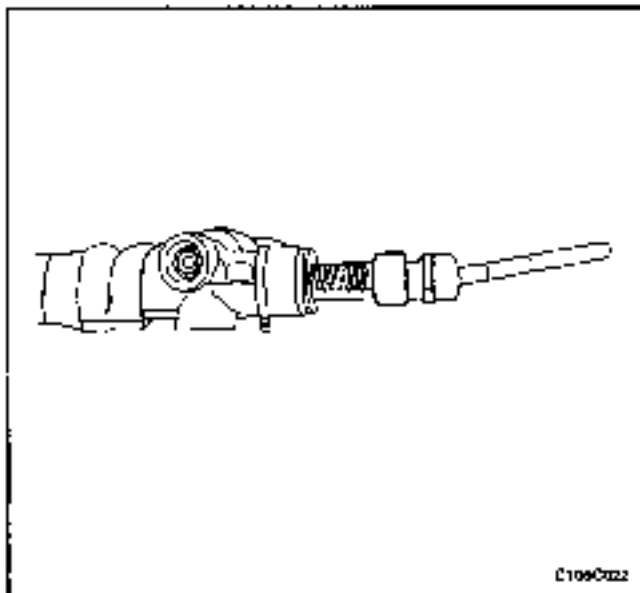


6. Remove the dust boot retaining clamps.

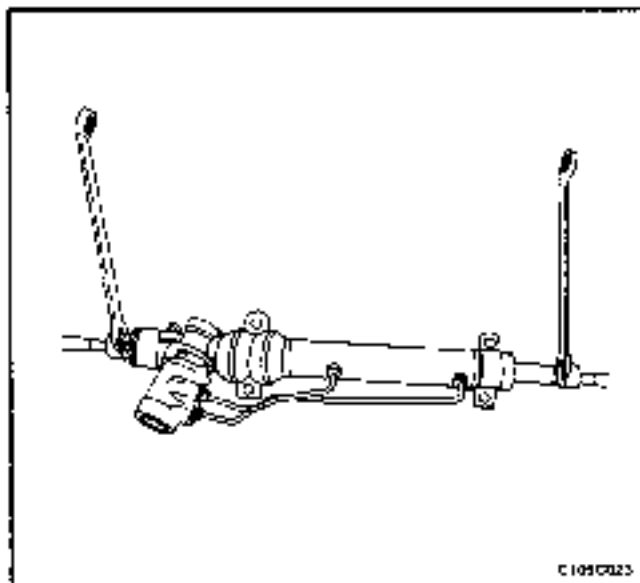
## 6C-30 POWER STEERING GEAR



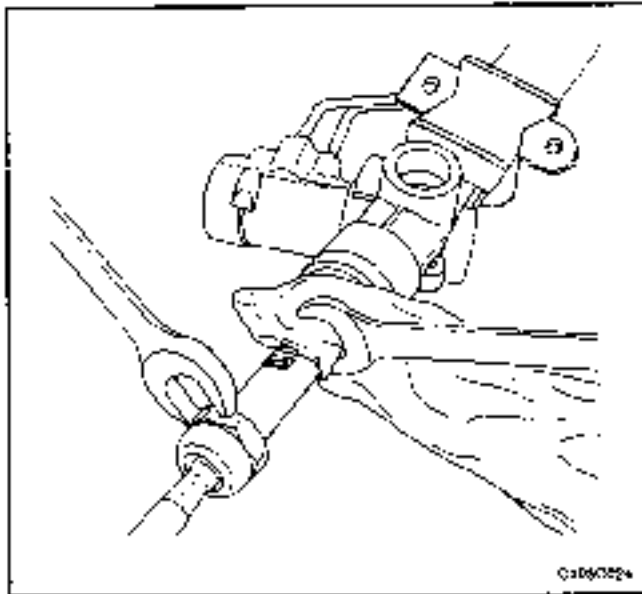
7. Remove the dust boot



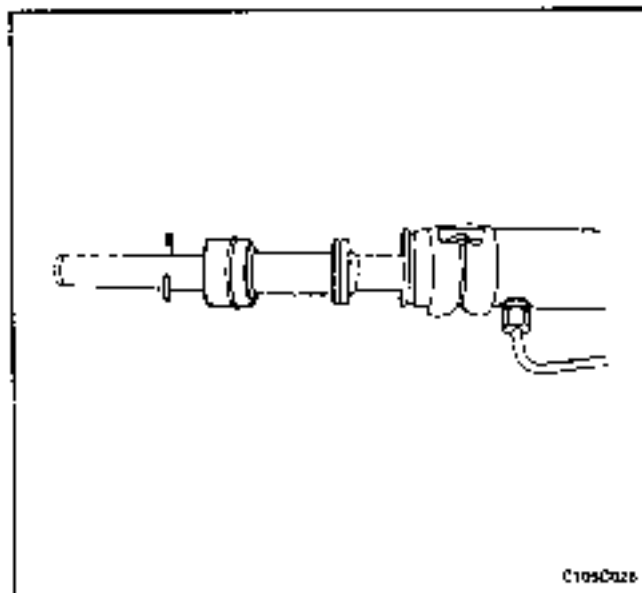
8. Push back the plastic retainer protecting the connection between the inner tie rod and the power steering gear rack.



9. Counterhold the pinion-side inner tie rod and remove the cylinder-side inner tie rod

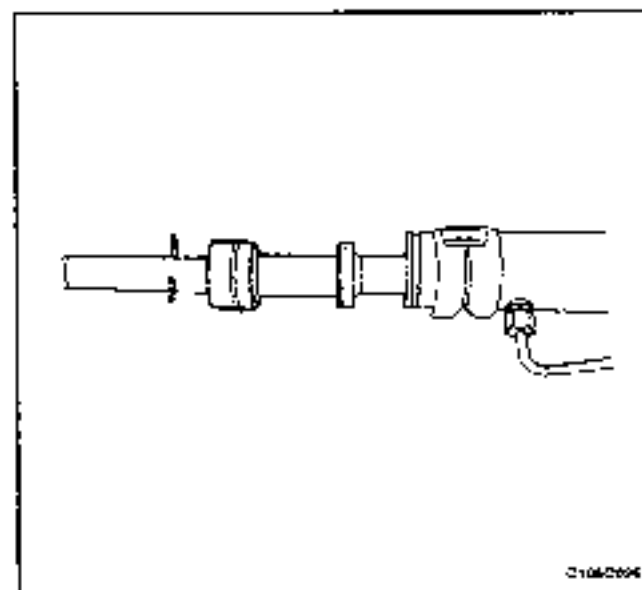


10. Place a rag over the rack, counterhold the rack assembly on the teeth with a wrench, and remove the pinion-side inner tie rod.



**Important:** The retaining ring can be released by inserting a small screwdriver through the hole in the side of the housing.

11. Remove the bulkhead inner cylinder retaining ring the bulkhead inner cylinder and the rack.

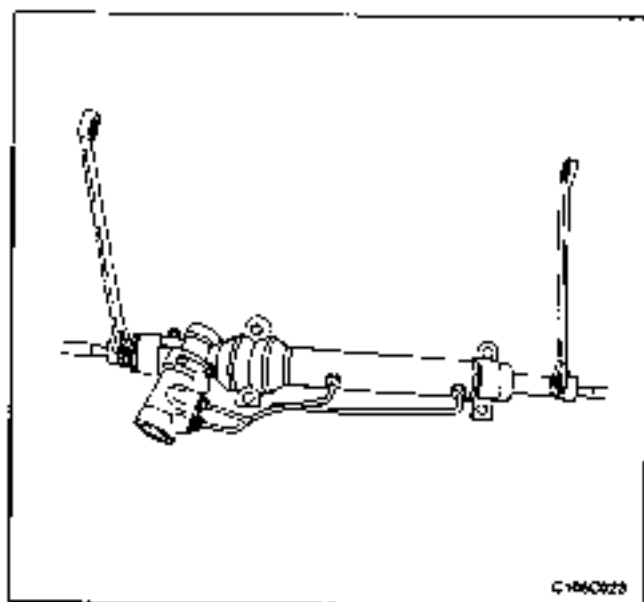


### Assembly Procedure

**Notice:** Coat all the seats with power steering fluid to ensure proper sealing.

1. Install the rack, the bulkhead inner cylinder and the bulkhead inner cylinder retaining ring.

## 6C-32 POWER STEERING GEAR



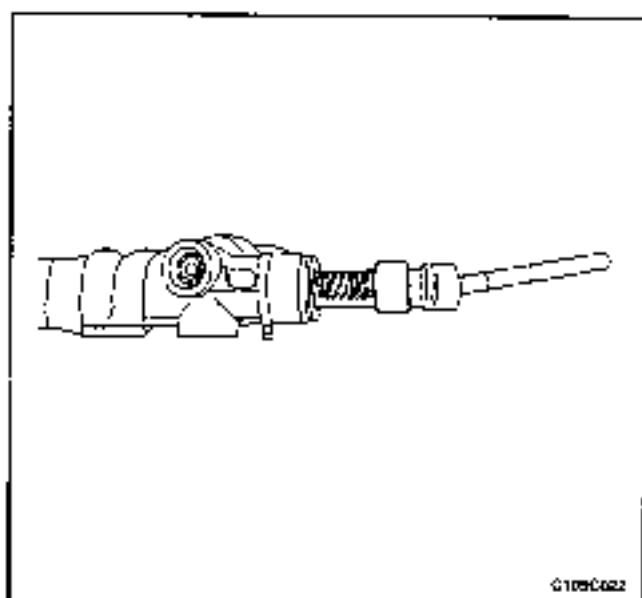
**Notice:** To prevent the inner tie rods from loosening, use Loctite<sup>®</sup> 242 (or equivalent) on both inner tie rod connections to secure them to the rack shaft.

**Important:** The right and left inner tie rods are unequal in length. Be sure to install the correct inner tie rod on the proper side of the power steering gear.

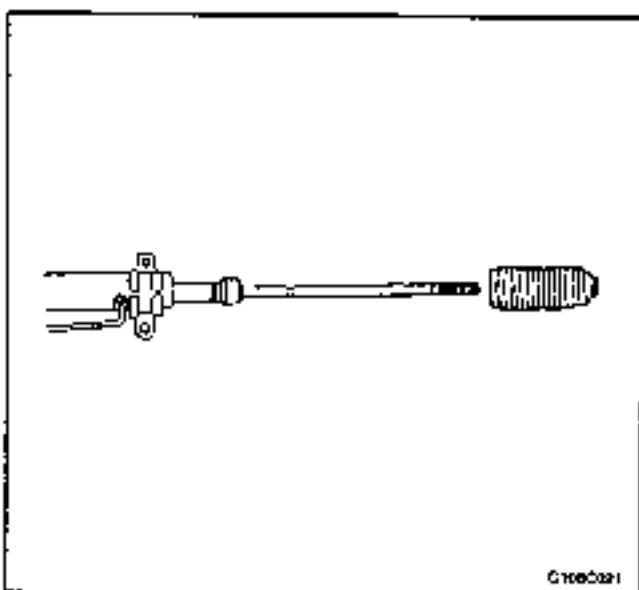
2. Firmly seat the inner tie rods against the rack and tighten both ends simultaneously.

### Tighten

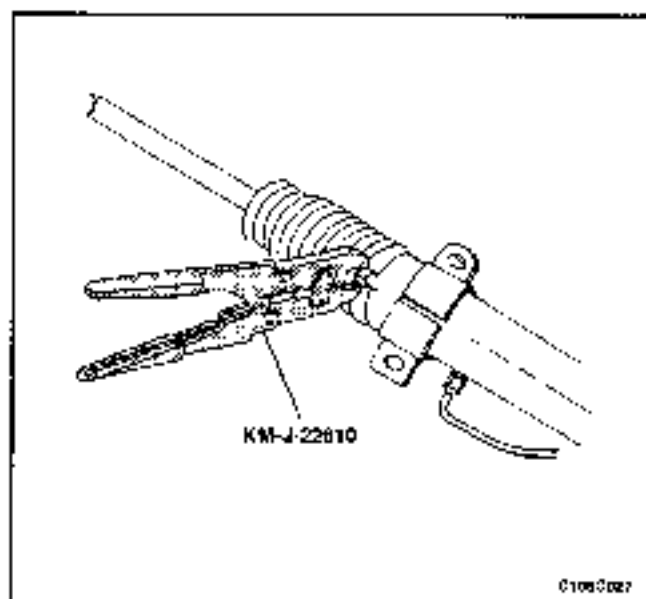
Tighten the inner tie rods to 100 N·m (74 lb-ft).



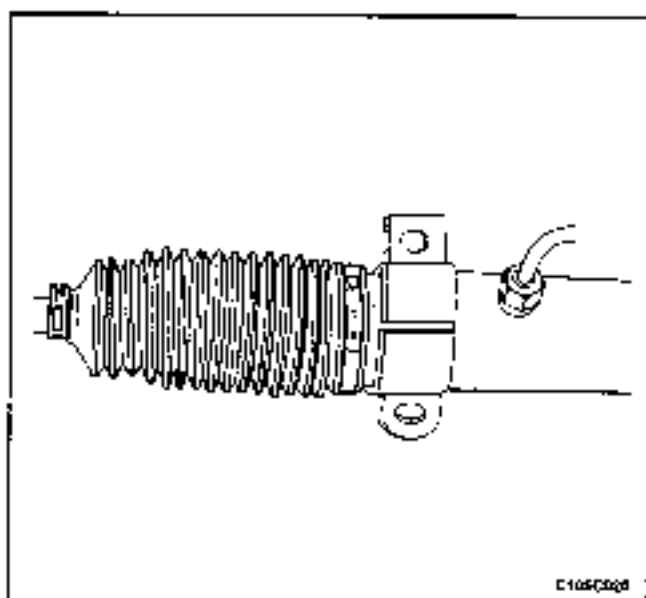
3. Push the plastic retainer back onto the connection between the inner tie rod and the power steering gear rack.



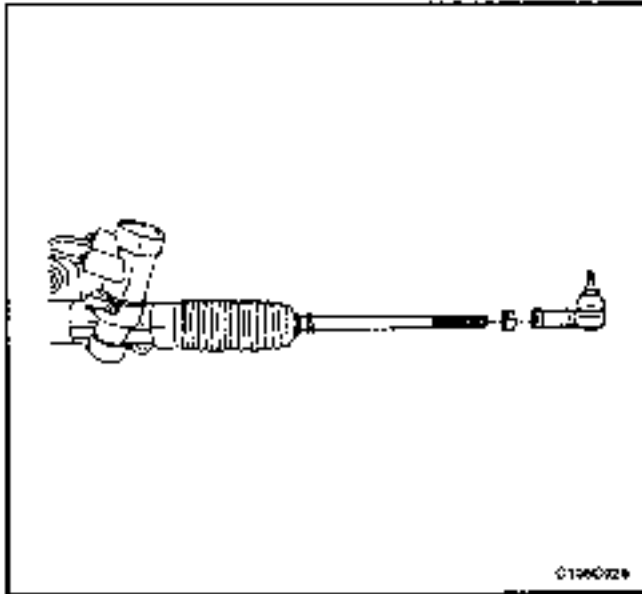
4. Install the dust boot.



5. Install the cylinder and dust boot retaining clamps with the installer KM-J-22610



6. Install the tie rod end boot retaining clamps.

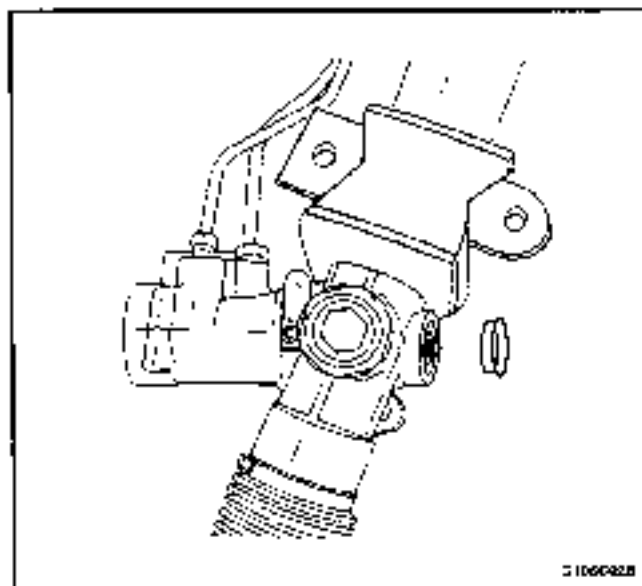


7. Reposition the adjusting nut to the marks on the inner tie rod and install the outer tie rod by twisting it onto the inner tie rod.
8. Perform a front toe adjustment. Refer to *Section 2B, Wheel Alignment*.
9. Tighten the adjusting nut.

**Tighten**

Tighten the outer tie rod adjusting nut to 64 N•m (47 lb-ft)

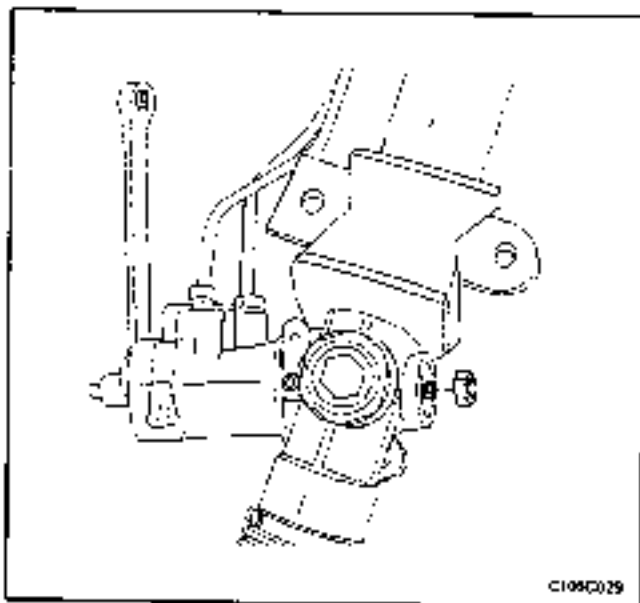
10. Install the rack bearing assembly into the rack and pinion steering assembly. Refer to "Rack Bearing" in this section.
11. Install the valve and pinion assembly into the rack and pinion steering assembly. Refer to "Valve and Pinion" in this section.
12. Install the rack and pinion steering assembly into the vehicle. Refer to "Rack and Pinion Assembly" in this section.



**STUB SHAFT SEALS AND UPPER AND LOWER BEARING**

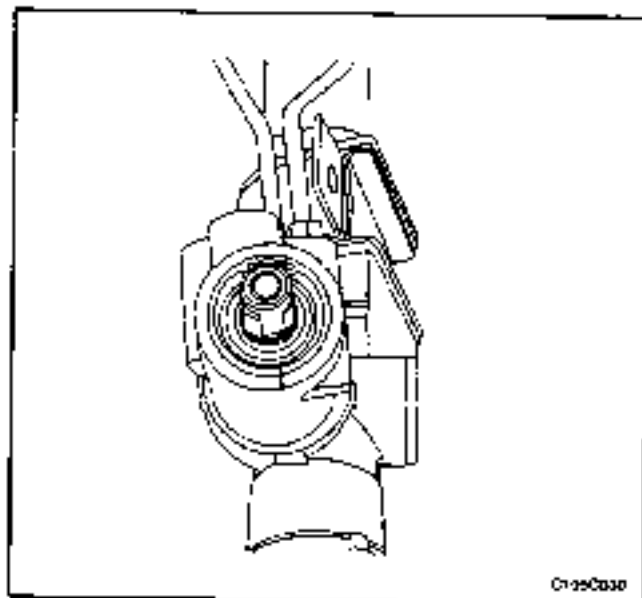
**Disassembly Procedure**

1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Remove the dust cover from the lower end of the housing.

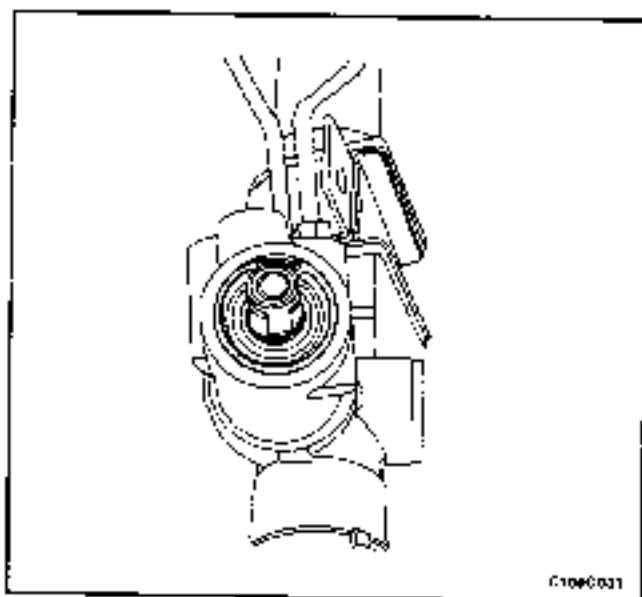


**Notice:** If the stub shaft is not held, damage to the pinion teeth will occur.

3. While holding the stub shaft with a wrench, remove the lockout from the pinion.

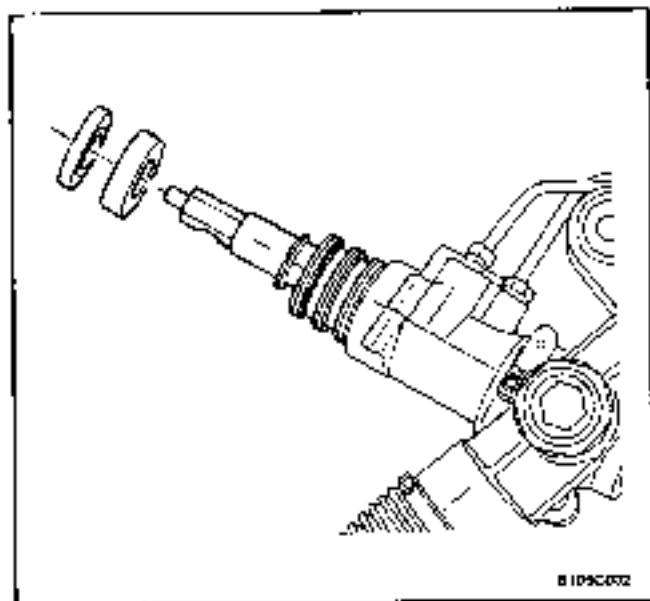


4. With the gear centered, mark the location of the stub shaft notch on the housing to aid in properly installing the valve and pinion assembly.

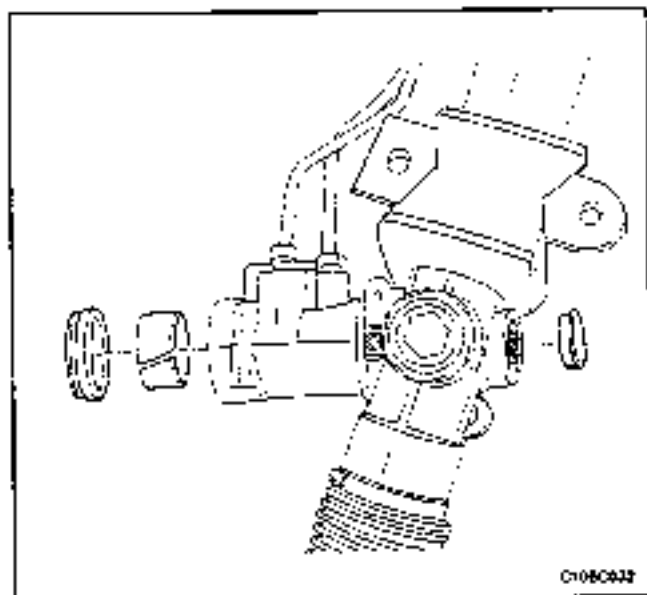


5. Remove the stub shaft retaining ring and, using an arbor press, press on the threaded end of the pinion until it is possible to remove the pinion and valve assembly from the housing.

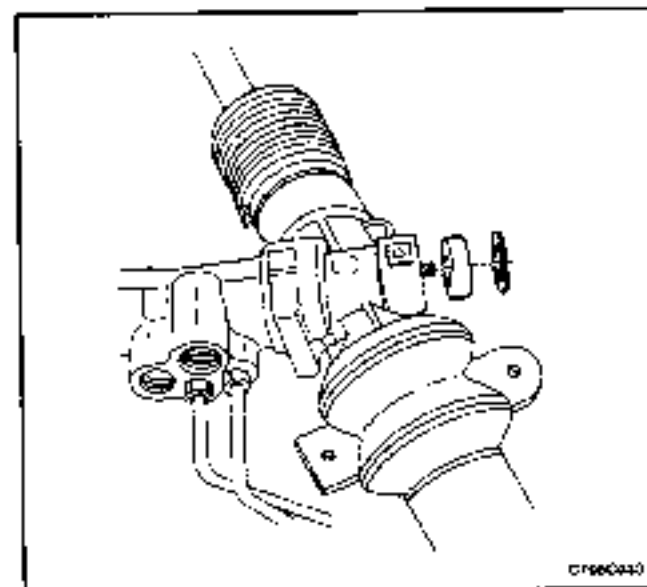
## 6C-36 POWER STEERING GEAR



6. Remove the stub shaft dust seal the stub shaft bearing annulus assembly and the valve assembly from the housing. Discard the stub shaft dust seal.

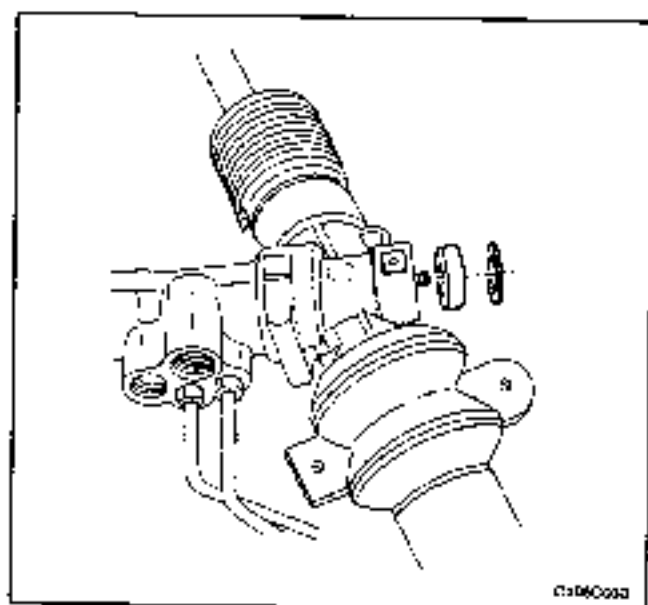


7. Remove the lower valve assembly bearing and the bushing.



8. Remove the lower bearing assembly retaining ring and press the lower bearing assembly from the lower end of the housing.

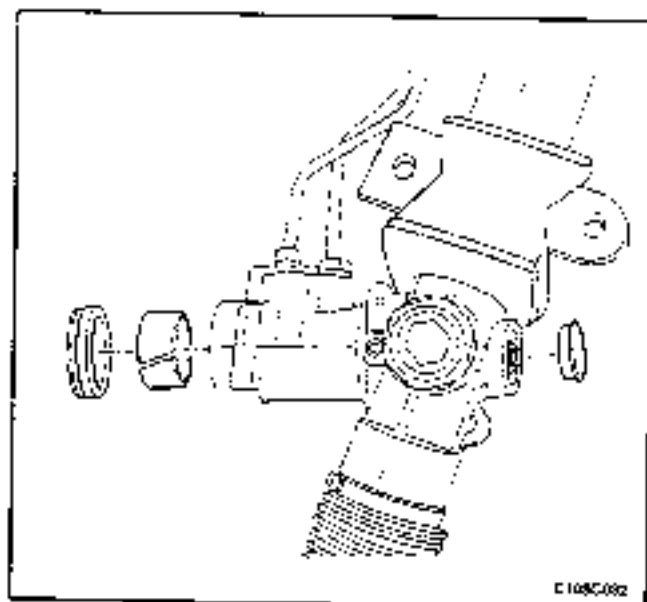




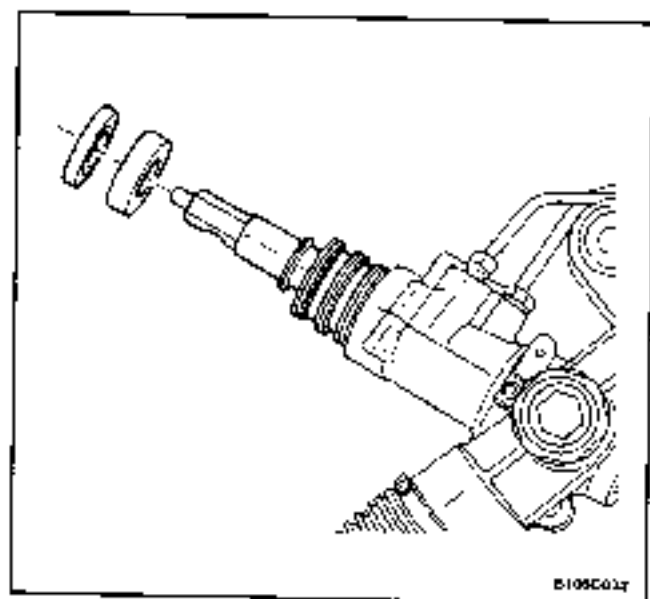
### Assembly Procedure

**Notice:** Coat all the seals with power steering fluid to ensure proper sealing.

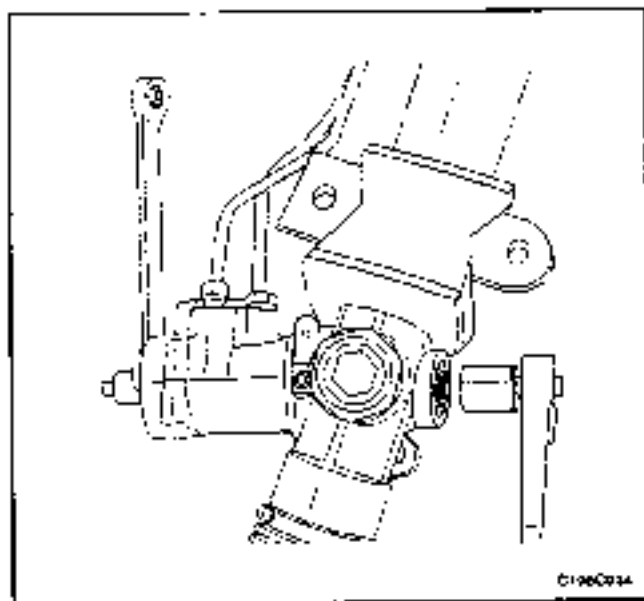
1. Install the lower bearing assembly and the lower bearing assembly retaining ring into the lower end of the housing.



2. Install the lower valve assembly bearing and the bushing.



3. Center the rack in the housing.
4. Install the the valve assembly, the stub shaft bearing annulus assembly and a new stub shaft dust seal into the housing.



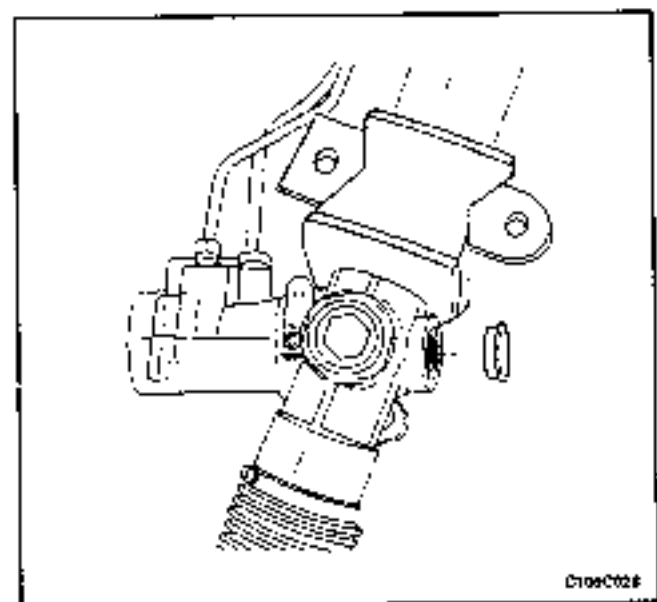
**Important:** When the valve and pinion assembly is fully seated in the housing, be sure that the notch in the stub shaft and the mark on the housing line up.

**Notice:** If the stub shaft is not held, damage to the pinion teeth will occur.

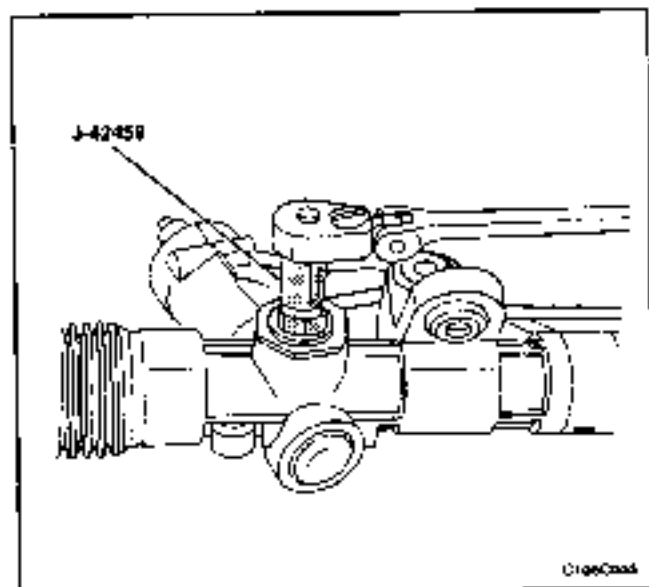
5. While holding the stub shaft, install the locknut onto the pinion shaft.

**Tighten**

Tighten the pinion locknut to 30 N•m (22 lb-ft)



6. Replace the dust cover onto the housing.
7. Install the rack and pinion steering assembly. Refer to "Rack and Pinion Assembly" in this section.



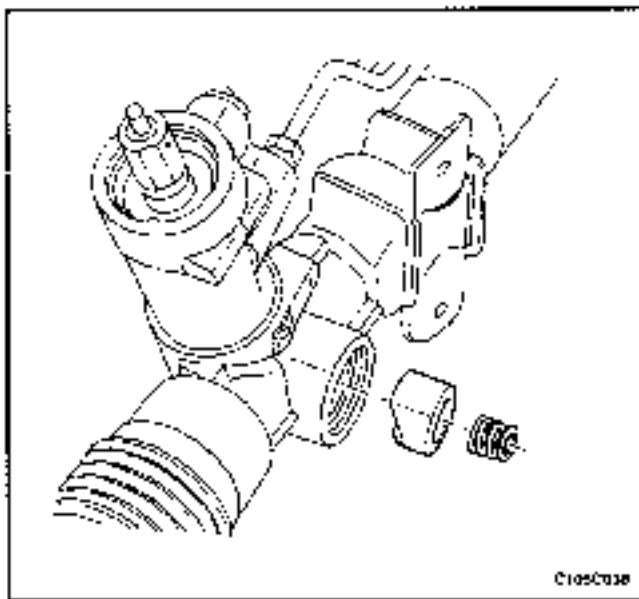
**RACK BEARING**

**Tools Required**

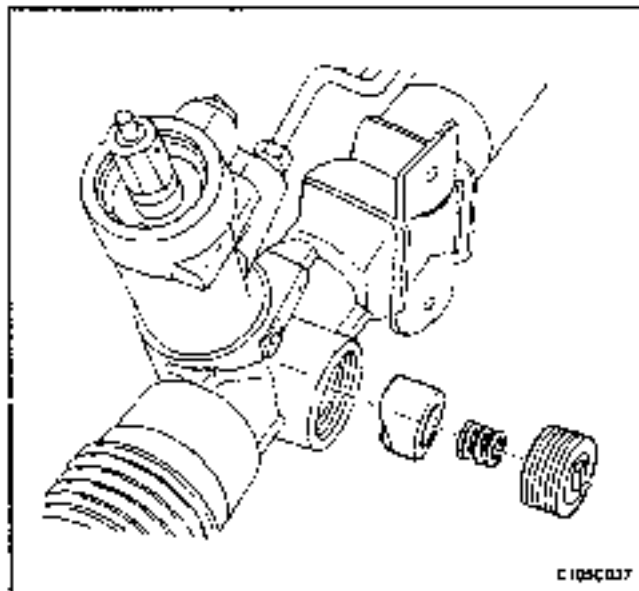
J-42459 Rack Guide Spring Cap Wrench

**Disassembly Procedure**

1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Remove the adjuster plug locknut from the adjuster plug, and remove the adjuster plug from the housing with the rack guide spring cap wrench J-42459, or with a 19 mm allen wrench.

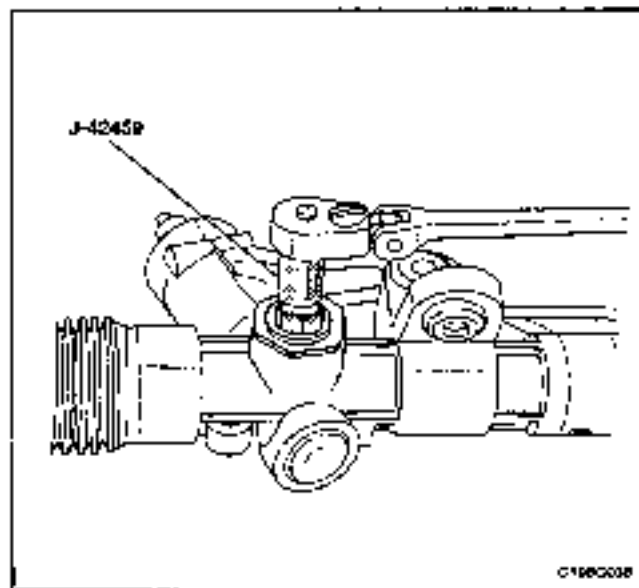


3. Remove the adjuster spring and the rack bearing.



### Assembly Procedure

1. Coat the rack bearing, the adjuster spring and the adjuster plug with lithium-based grease and install them into the housing.



2. With the rack centered, turn the adjuster plug clockwise until a torque of 7 N·m (62 lb-in) is obtained, then back it off by 30 to 40 degrees. Check the pinion torque. Maximum pinion preloaded torque is 1 N·m (9 lb-in).

3. Thread the lock nut on the adjuster plug and tighten it.

### Tighten

Tighten the adjuster plug lock nut to 75 N·m (56 lb-ft) while holding the adjuster plug stationary with the rack guide spring cap wrench J-42459 or with a 19 mm allen wrench.

4. Install the rack and pinion assembly. Refer to "Rack and Pinion Assembly" in this section.

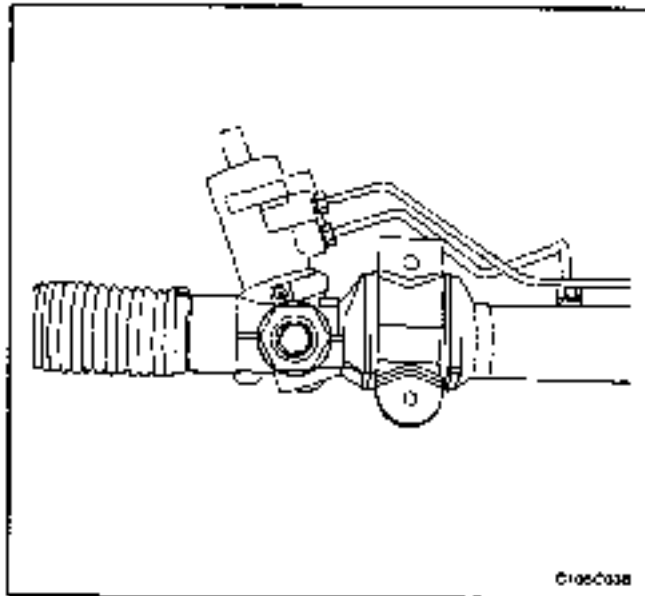
## RACK BEARING PRELOAD ADJUSTMENT

### Adjustment Procedure

1. Raise and suitably support the vehicle.
2. Center the steering wheel.
3. Remove the power steering gear. Refer to "Rack and Pinion Assembly" in this section.
4. Loosen the locknut and turn the adjuster plug clockwise until a torque of 7 N•m (62 lb•in) is obtained, then loosen it by 30 to 40 degrees. Check the pinion torque. Maximum pinion preloaded torque is 1 N•m (9 lb•in).
5. Tighten the locknut on the adjuster plug while holding the adjuster plug stationary.
6. Install the power steering gear. Refer to "Rack and Pinion Assembly" in this section.
7. Be sure to check the returnability of the steering wheel to center position after adjustment.

### Tighten

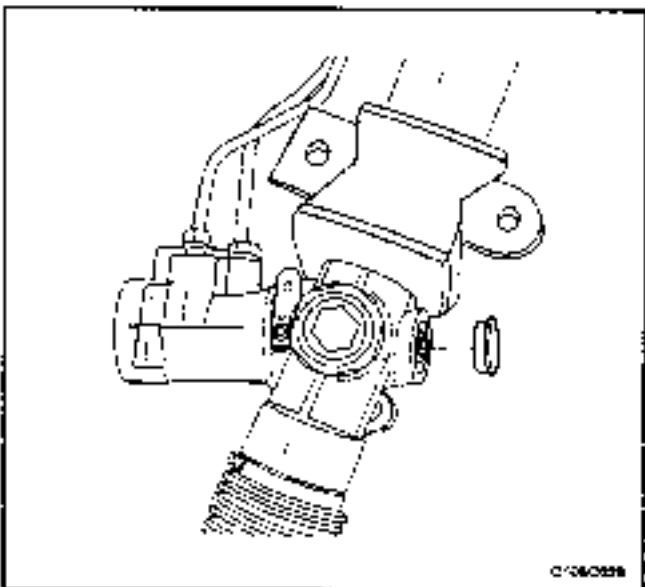
Tighten the adjuster plug locknut to 75 N•m (56 lb•ft).

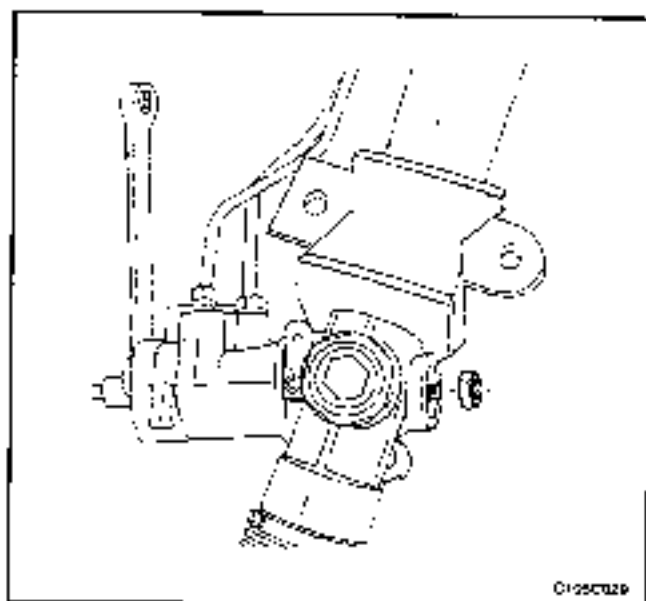


## VALVE AND PINION

### Disassembly Procedure

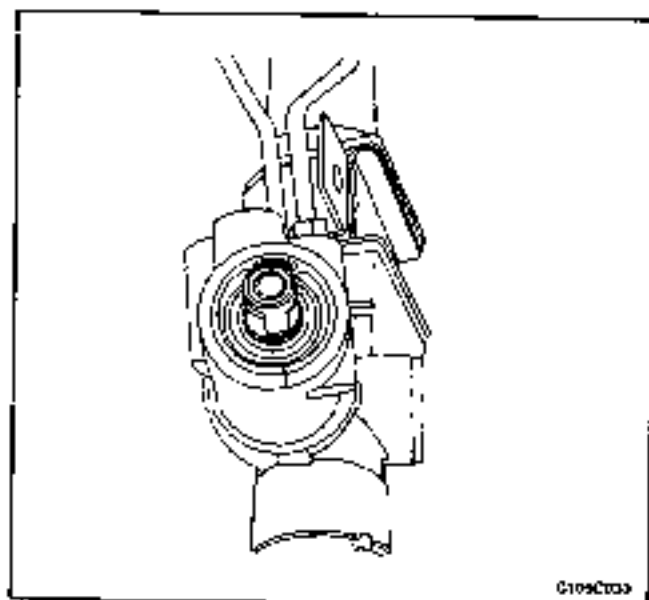
1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Remove the dust cover from the lower end of the housing.



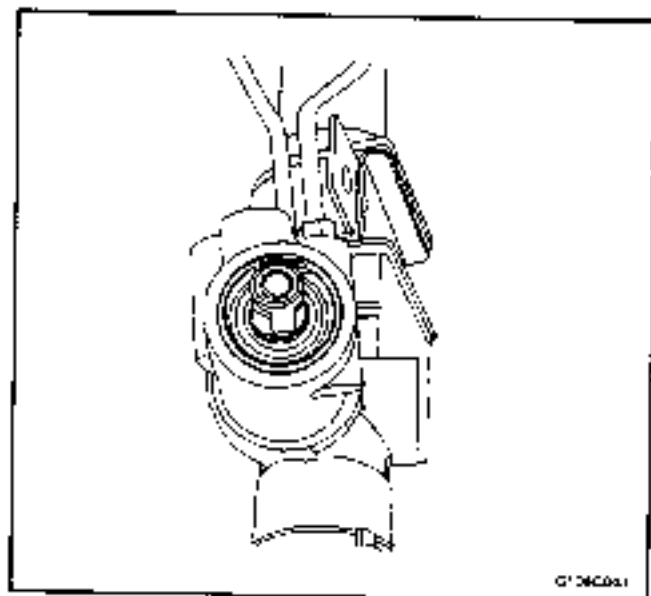


**Notice:** If the stub shaft is not held, damage to the pinion teeth will occur.

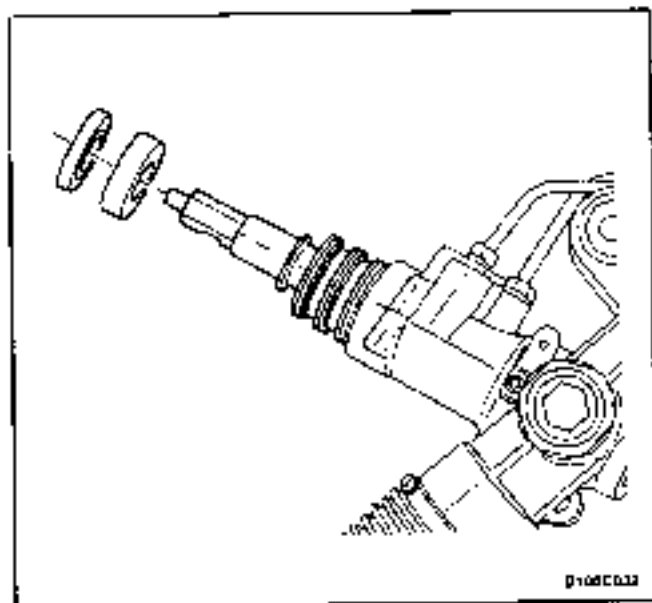
- 3 While holding the stub shaft, remove the locknut from the pinion.



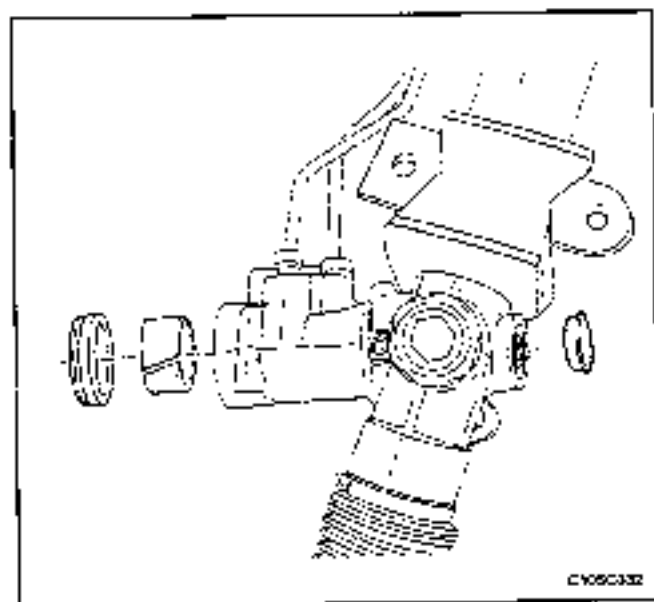
- 4 With the gear centered, mark the location of the stub shaft notch on the housing to aid in properly installing the pinion and valve assembly.



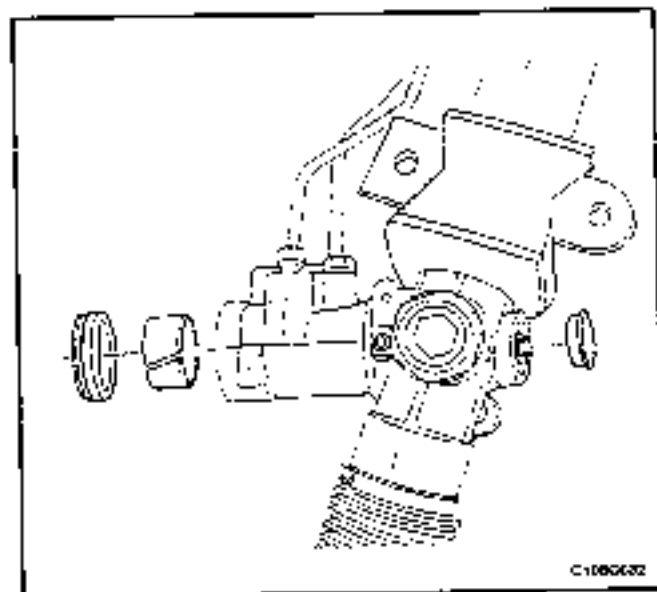
- 5 Remove the upper housing retaining ring and, using an arbor press, press on the threaded end of the pinion until it is possible to remove the valve and pinion assembly from the housing.



6. Remove the stub shaft dust seal, the stub shaft bearing annulus assembly and the valve and pinion assembly from the housing.



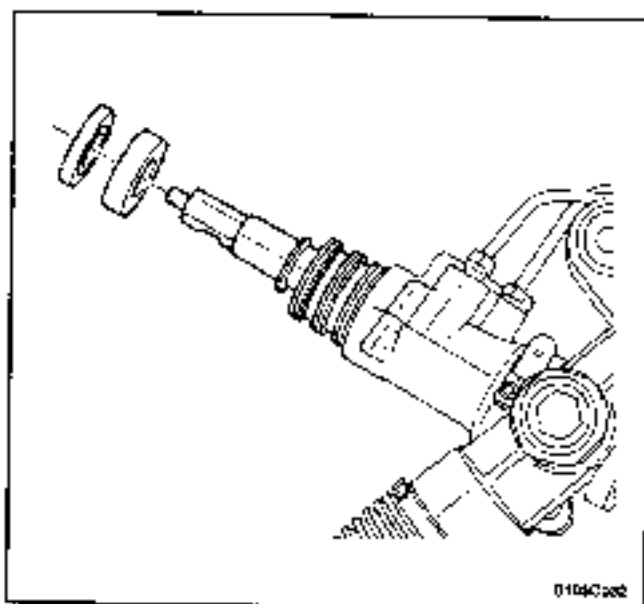
7. Inspect the valve body rings for wear or damage. Replace the valve body rings as needed. Coat the rings with power steering fluid before installation.
8. Remove the lower pinion valve seal and bushing. Discard the seal.



### Assembly Procedure

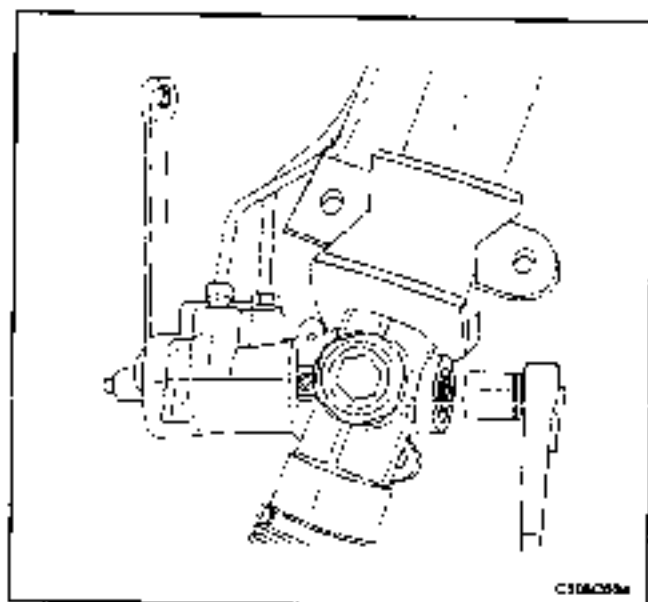
**Notice:** Coat all of the seals and bushings with power steering fluid to ensure proper sealing

1. Install the bushing and a new lower pinion valve seal.



**Important** When the valve and pinion assembly is fully seated in the housing, be sure the notch in the stub shaft and the mark on the housing line up. If this is not done the vehicle will not pass the straight-ahead check and will have poor steering performance.

2. Install the valve and pinion assembly, the stub shaft bearing annulus assembly and the stub shaft dust seal.

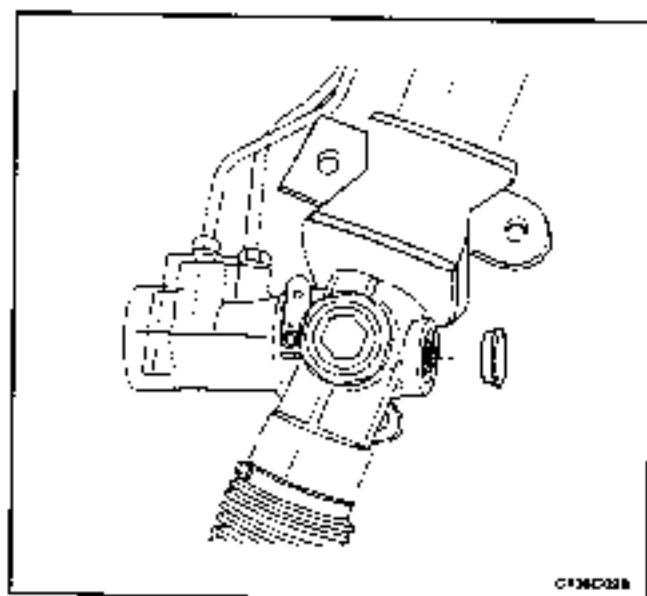


**Notice:** If the stub shaft is not held, damage to the pinion teeth will occur.

3. While holding the stub shaft, tighten the locknut onto the pinion shaft.

#### **Tighten**

Tighten the pinion locknut to 36 N•m (22 lbf•ft).



4. Replace the dust cover onto the housing.
5. Install the rack and pinion steering assembly. Refer to "Rack and Pinion Assembly" in this section.
6. Perform the straight-ahead check. Refer to "Straight-Ahead Check" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### POWER RACK AND PINION

The power rack and pinion steering system has a rotary control valve that directs hydraulic fluid coming from the hydraulic pump to one side or the other side of the rack piston. The integral rack piston is attached to the rack. The rack piston converts hydraulic pressure to a linear force that moves the rack left or right. That force is then transmitted through the tie rods to the steering knuckles, which turn the wheels.

If power rack and pinion steering is not available, manual rack and pinion control is used, however, with this system, more steering effort is required. The movement of the steering wheel is transferred to the pinion. The rotary movement of the pinion is then transferred through the pinion threads, which mesh with teeth on the rack, thereby causing the rack to move in a linear direction.

A vane-type of hydraulic pump provides hydraulic pressure for both steering systems.

### SPEED SENSITIVE POWER STEERING SYSTEM

The speed sensitive power steering (SSPS) system varies the driver effort required to steer as the vehicle speed changes. At low speeds, the system provides maximum power assist for easy turning and parking maneuvers. At higher speeds, the steering power is reduced to provide the driver with firmer steering and directional stability. The SSPS system accomplishes this by reducing the amount of power steering fluid flow from the power steering pump to the power steering gear as the vehicle speed increases. When the vehicle is stationary, the SSPS system provides maximum fluid flow to the steering gear. As the vehicle speed increases, the fluid flow to the steering gear is decreased.

#### Control Module

The SSPS control module processes the vehicle speed information from the engine control module (ECM) and uses the steering wheel rotation sensor to provide a control signal to the electronic variable orifice (EVO) actuator located on the power steering pump.

#### Electronic Variable Orifice (EVO) Actuator

The electronic variable orifice (EVO) actuator is located on the power steering pump and contains a solenoid-operated pintle valve. Fluid leaving the pump passes through an orifice in the actuator tip. When the EVO actuator is powered by the SSPS control module, the pintle moves into the orifice and reduces the power steering fluid flow. As the vehicle speed increases, current from the SSPS control module increases, and the pintle blocks more and more of the orifice.

### Steering Wheel Rotation Sensor

The steering wheel rotation sensor is located at the end of the steering column housing and is used to send a signal to the controller when abrupt or evasive steering maneuvers are needed.

### Power Steering Pressure Hose

SSPS vehicles have a specific pressure hose assembly which includes an in-line check valve in the rack and pinion assembly. This reduces the amount of steering wheel "kick" when driving over irregular road surfaces while operating at speeds with reduced flow rate and pressure.

### Power Rack and Pinion

Except for differences in valve machining, the design of the SSPS power rack and pinion assembly is the same as for the a non-SSPS system. The steering wheel movement is transferred to the pinion via the intermediate shaft. The pinion moves the rack left or right through meshing the pinion and the rack teeth. The force is then transmitted through the tie rods and steering knuckle to steer the wheels.

The power rack and pinion steering system has a rotary control valve which directs the hydraulic fluid from the power steering pump to one side or the other side of the rack piston. The piston is attached to the rack and uses hydraulic pressure to move the rack left or right. The rotary control valve regulates the degree of assist by responding to the driver's torque input.

If hydraulic assist is not available, manual control is maintained. However, under this condition, more steering effort is required.

### Power Steering Pump

The standard vane-type pump, which provides hydraulic pressure for the system, incorporates a special discharge timing to hold the EVO actuator.

### System Operation

System operation originates with input from the vehicle speed sensor via the engine control module to the SSPS control module. The SSPS control module sends a signal to the SSPS actuator to vary the rate of fluid flow output by the power steering pump.

### Circuit Operation

The SSPS system uses inputs from the speed sensor and steering wheel rotation sensor to the SSPS controller to determine the desired amount of power steering assist.

The SSPS control module constantly compares the amount of current flowing through the EVO actuator to the desired current it has calculated. The EVO actuator has a pintle that moves in and out of an orifice, regulating power steering fluid flow. The SSPS control module can change the amount of current flowing through the



EVO actuator by varying the output duty cycle. If the EVO actuator is disconnected, the pintle will be pulled out of the orifice for maximum power steering assist.

The SSPS control module has the ability to detect faults in the steering wheel rotation sensor, the EVO actuator, or the circuitry to those components. Any default detected will cause the power steering assist to remain at maximum with the pintle in its normally retracted position for all speeds.

When the system is operating normally, increasing the vehicle speed will decrease power steering assist, allowing the driver to have improved road feel and directional stability. When sudden steering wheel turns are made, as in evasive maneuvers, they are detected by the SSPS control module through the steering wheel rotation sensor. When detected, the SSPS control module reduces current to the EVO actuator, allowing greater power steering assist.



## SECTION 6E

# STEERING WHEEL AND COLUMN

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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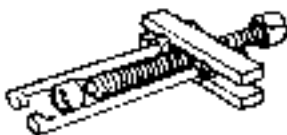
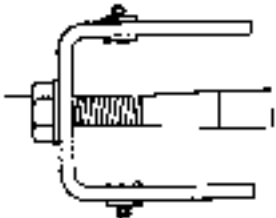


## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Ignition Switch Housing Shear Bolts	11	-	97
Ignition Switch Retaining Screw	2	-	18
Steering Column Jacket Assembly Front Bracket Bolts	22	16	-
Steering Column Jacket Assembly Rear Bracket Nuts	22	16	-
Steering Shaft Universal Joint Pinch Bolt	25	18	-
Steering Wheel Horn Cap Screws	4.5	-	40
Steering Wheel Nut	23	17	-
Steering Wheel Rotation Sensor Retaining Screw	2	-	18
Support Housing Screws	16	12	-
Turn Signal Switch Housing Screws	3	-	27
Upper and Lower Steering Column Cover Panel Screws	3	-	27

## SPECIAL TOOLS

### SPECIAL TOOLS TABLE

 <p style="text-align: center;">KM-210-A Steering Wheel Puller</p> <p style="text-align: center;">A1109008</p>		 <p style="text-align: center;">J-23853-A Lock Plate Compressor</p> <p style="text-align: center;">A104C060</p>	
 <p style="text-align: center;">J-35667 Lock Plate Adapter (tilt)</p> <p style="text-align: center;">A1056087</p>		 <p style="text-align: center;">J-21854-01 Pivot Pin Remover</p> <p style="text-align: center;">A105E063</p>	

## DIAGNOSIS

### STEERING COLUMN DIAGNOSIS

#### Lock System

##### Lock System Will Not Unlock

Checks	Action
Check the lock cylinder for damage.	Replace the lock cylinder.
Check the ignition switch for lack of free movement.	Lubricate the ignition switch.
Check the steering column housing for binding or damage.	Remove the steering shaft and clear the steering column housing. Replace the steering column housing as needed.

##### Lock System Will Not Lock

Checks	Action
Check the lock cylinder for damage.	Replace the lock cylinder.
Check the ignition switch for a lack of free movement.	Lubricate the ignition switch.
Check the steering column housing for binding or damage.	Remove the steering shaft and clear the steering column housing. Replace the steering column housing as needed.

**High Lock Effort**

Checks	Action
Check the lock cylinder for damage.	Replace the lock cylinder.
Check the ignition switch for lack of free movement.	Lubricate the ignition switch.
Check for extreme misalignment of the housing to the cover.	Realign the cover on the housing. Replace the cover as needed.
Check for a bent ignition switch mounting bracket.	Replace the ignition switch mounting bracket.

**Key Cannot Be Removed in the LOCK Position**

Checks	Action
Check to see that the ignition switch is set correctly.	Reset the ignition switch.
Check the lock cylinder for damage.	Replace the lock cylinder.

**Column****Noise in the Column**

Checks	Action
Check the steering gear-to-column joints for improper installation.	Tighten the steering shaft universal joint pinch bolts. Replace the steering shaft joints as needed.
Check the steering shaft bearing for wear or damage.	Replace the steering shaft bearing.
Check the spherical joint for lack of lubrication.	Lubricate the spherical joint.
Check the steering shaft for lack of lubrication.	Lubricate the steering shaft bearing.
Check the shaft lock snap ring for improper seating.	Adjust the shaft lock snap ring. Replace the shaft lock snap ring as needed.

**High Steering Shaft Effort**

Checks	Action
Check the steering shaft bearing for wear or damage.	Replace the steering shaft bearing.
Check for an improperly installed or deformed dust seal.	Replace the dust seal.
Check for a damaged upper or lower bearing.	Replace the upper or the lower bearing.
Check the steering shaft universal joints for a lack of free movement.	Lubricate the steering shaft universal joints. Replace the steering shaft universal joints as needed.

**Lash in the Steering Column**

Checks	Action
Check the steering column bracket mounting bolts for improper installation.	Tighten the steering column bracket mounting bolts.
Check for broken weld nuts on the steering column jacket.	Replace the steering column jacket.
Check for loose steering column housing-to-steering column jacket support screws.	Tighten the support screws.

**Loose Steering Wheel**

Checks	Action
Check for excessive clearance between the holes in the steering wheel support or the housing and the pivot-pin diameters.	Replace the pivot pins with pivot pins of the correct size.
Check to see if the upper bearing is seated correctly in the housing.	Correctly seat the upper bearing. Replace the upper bearing as needed.
Check for loose steering column housing support screws.	Tighten the steering column housing support screws.

**Noise When Tilting the Column**

Checks	Action
Check for worn upper tilt bumpers.	Replace the upper tilt bumpers.
Check for tilt spring binding.	Adjust the tilt spring. Replace the tilt spring as needed.

**Turn Signal/Dimmer Switch****Turn Signal Will Not Stay in the Turn Position**

Checks	Action
Check the turn signal switch for an improper installation.	Remove and inspect the turn signal switch. Reinstall the switch.
Check the cancelling mechanism for broken or missing components.	Replace the cancelling mechanism.
Check the turn signal switch housing for foreign material.	Remove any foreign material.

**Turn Signal Will Not Cancel**

Checks	Action
Check the cancelling mechanism for broken or missing components.	Replace the cancelling mechanism.

**Turn Signal/Dimmer Switch Difficult to Operate**

Checks	Action
Check the turn signal/dimmer switch and turn signal/dimmer switch lever for improper installation.	Remove and inspect the turn signal/dimmer switch and signal/dimmer switch lever. Reinstall the signal/dimmer switch and signal/dimmer switch lever.
Check the signal/dimmer switch housing for foreign material.	Remove any foreign material.

**Turn Signal Will Not Indicate Lane Change**

Checks	Action
Check for a broken lane change pressure pad or a broken spring hanger.	Replace the lane change pressure pad or the spring hanger.
Check for improper functioning of the lane change spring.	Replace the lane change spring.
Check the turn signal switch for improper installation.	Replace the turn signal switch.

**No Turn Signal Lights**

Checks	Action
Check for an inoperative turn signal flasher.	Replace the turn signal flasher.
Check for a faulty turn signal switch.	Replace the turn signal switch.
Check the chassis-to-column connector for an improper connection.	Reconnect the chassis-to-column connector.

**Turn Indicator Lights On, but Not Flashing**

Checks	Action
Check for an inoperative turn signal flasher.	Replace the turn signal flasher.
Check for a faulty turn signal switch.	Replace the turn signal switch.
Check the chassis-to-column connector for an improper connection.	Reconnect the chassis-to-column connector.

**Front or Rear Turn Signal Lights Not Flashing**

Checks	Action
Check for a faulty turn signal switch.	Replace the turn signal switch.
Check the chassis-to-column connector for an improper connection.	Reconnect the chassis-to-column connector.

**Turn Signal Lights Flash Very Slowly**

Checks	Action
Check the chassis-to-column connector for an improper connection.	Reconnect the chassis-to-column connector.

**Ignition Switch****Electrical System Will Not Function**

Checks	Action
Check the ignition switch for damage.	Replace the ignition switch.
Check the ignition switch for improper installation.	Remove and inspect the ignition switch. Reinstall the ignition switch.
Check the ignition switch electrical connector for improper installation.	Reconnect the ignition switch electrical connector. Replace the ignition switch electrical connector.

**Ignition Switch Will Not Turn**

Checks	Action
Check the ignition switch for damage.	Replace the ignition switch.
Check the ignition switch for improper installation.	Remove and inspect the ignition switch. Reinstall the ignition switch.

**Wiper/Cruise Control Switch Lever****Switch Inoperative: No LOW, HIGH, INTERMITTENT or WASH**

Checks	Action
Check the wiper switch for damage.	Replace the wiper/cruise control switch.
Check the wiper switch for improper installation.	Remove and inspect the wiper/cruise control switch. Reinstall the wiper/cruise control switch.
Check the cruise control switch for damage.	Replace the wiper/cruise control switch.



## MAINTENANCE AND REPAIR

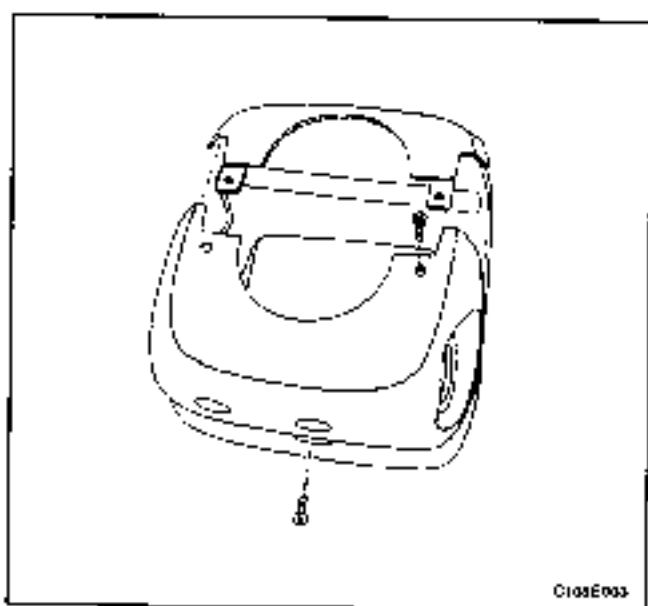
### ON-VEHICLE SERVICE

#### HEADLAMP/TURN SIGNAL SWITCH AND LEVER

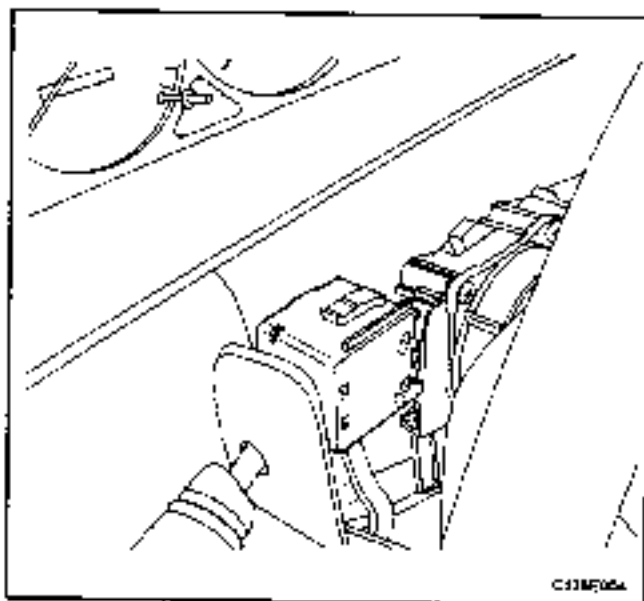
(Left-Hand Drive Shown, Right-Hand Drive Similar)

##### Removal Procedure

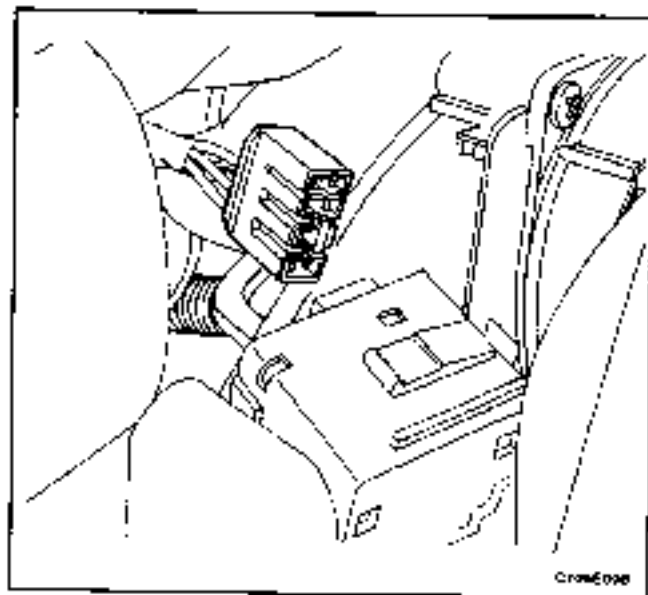
1. Disconnect the negative battery cable.
2. Remove the upper and the lower steering column cover panel screws.
3. Remove the upper and the lower steering column cover panels.
4. Remove the turn signal switch by pushing in on the tabs on the top and the bottom of the switch housing.
5. Disconnect the electrical connectors from the turn signal switch.



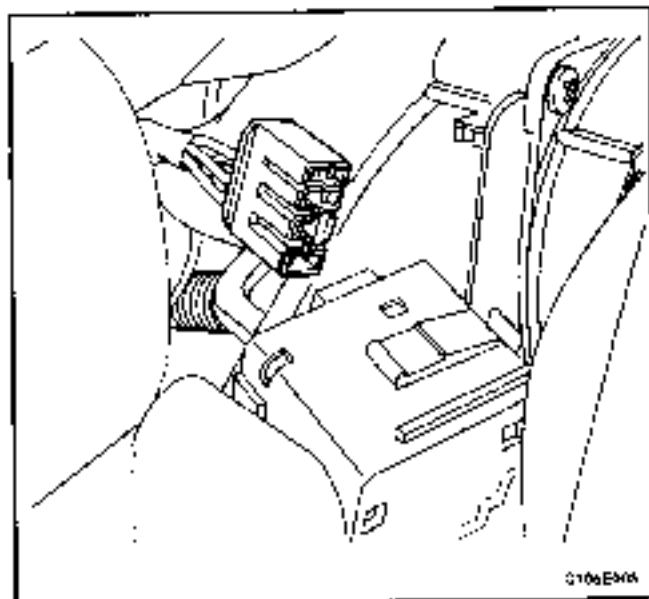
C103E003



C118E004

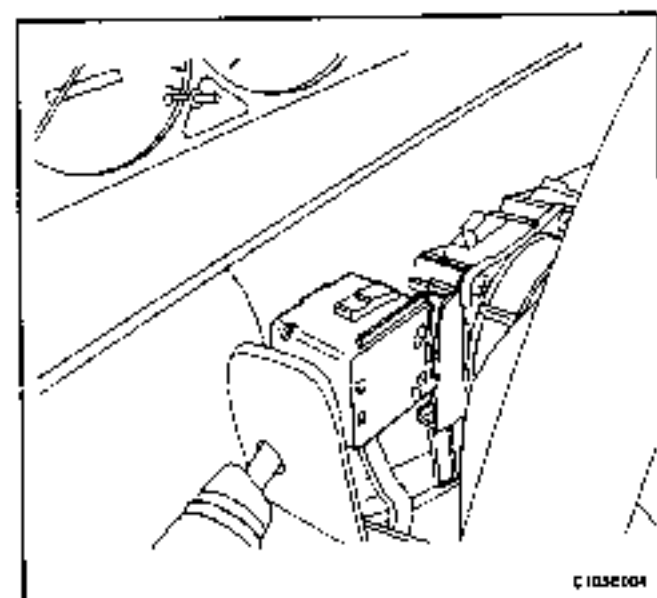


C106E006

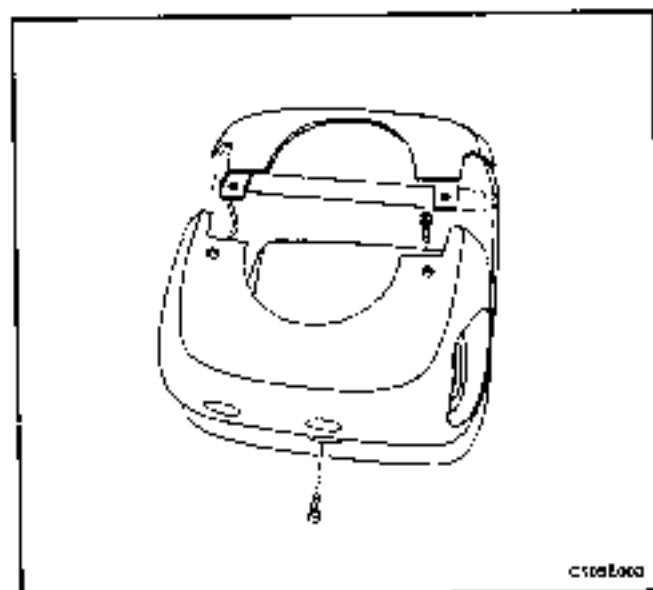


### Installation Procedure

1. Connect the electrical connections to the turn signal switch.



2. Install the turn signal switch by snapping it into the switch housing.

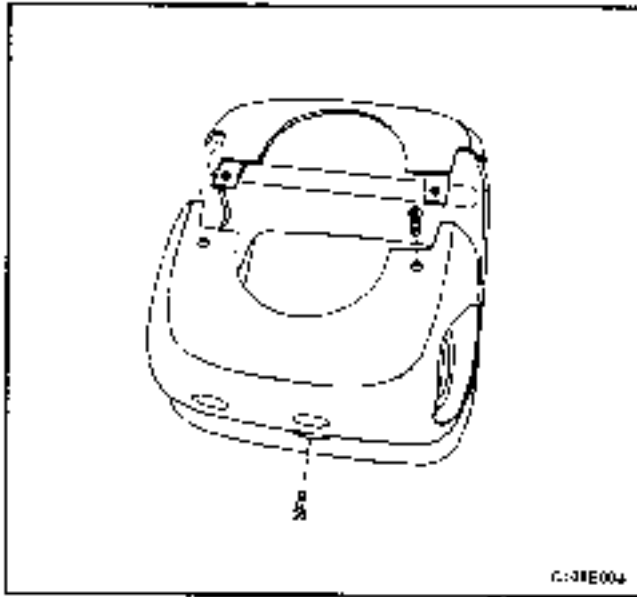


3. Install the upper and the lower steering column cover panels. Install the upper and the lower steering column cover panel screws.

### Tighten

Tighten the upper and the lower steering column cover panel screws to 3 N•m (27 lb-in).

4. Connect the negative battery cable.

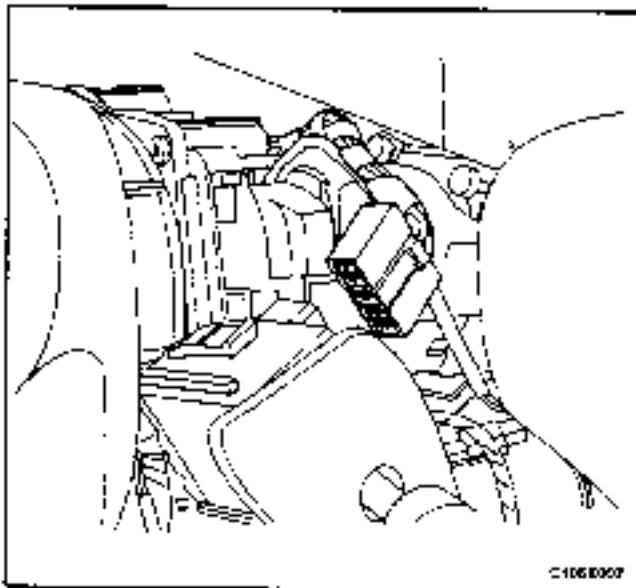
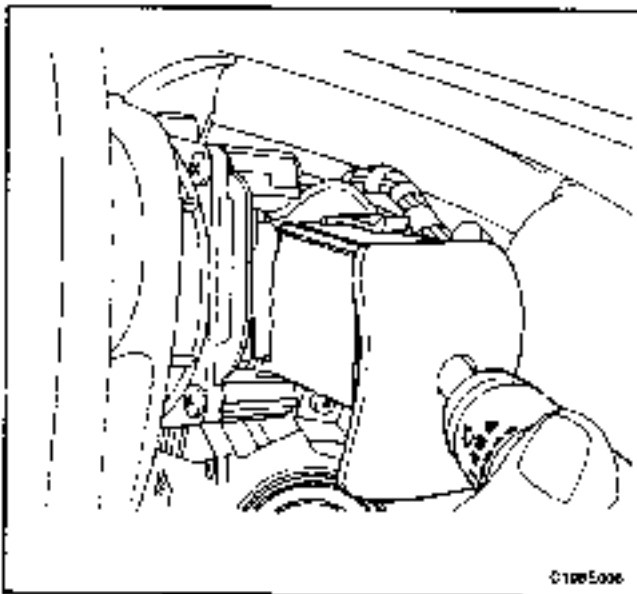


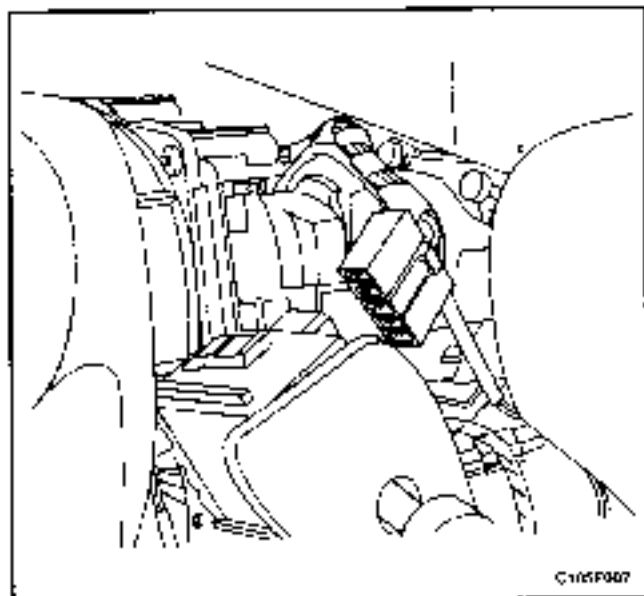
## WIPER/CRUISE CONTROL SWITCH AND LEVER

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

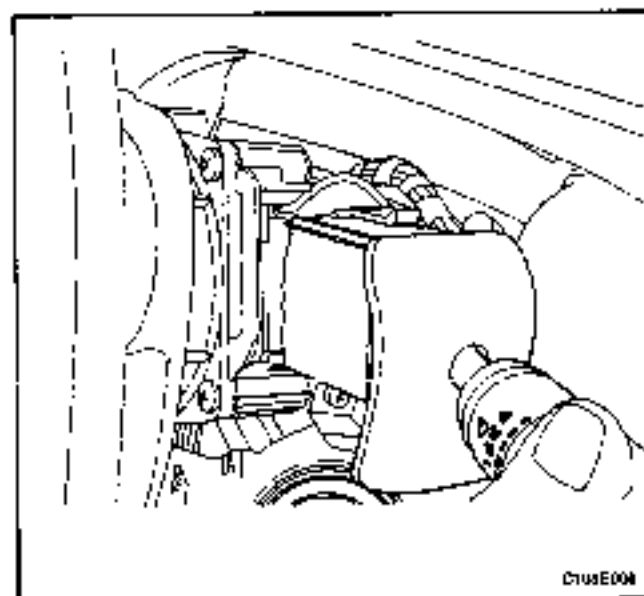
1. Disconnect the negative battery cable.
2. Remove the upper and the lower steering column cover panel screws.
3. Remove the upper and the lower steering column cover panels.
4. Remove the wiper switch by pushing in on the tabs on the top and the bottom of the switch housing.
5. Disconnect the electrical connector from the wiper switch. Disconnect the cruise control connector, if equipped.



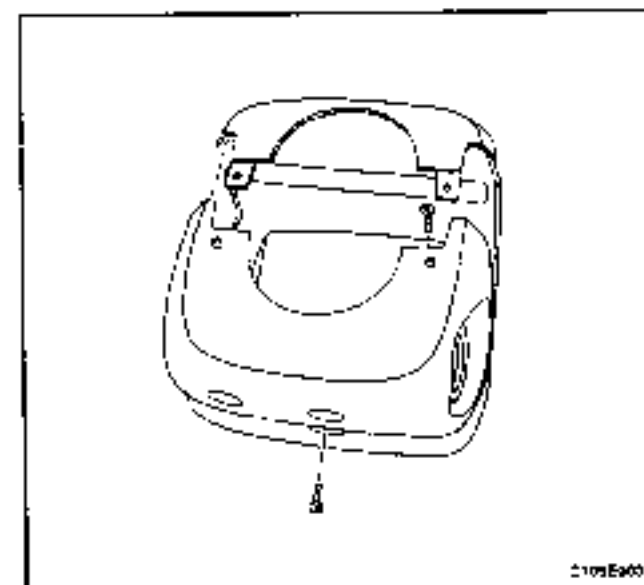


### Installation Procedure

1. Connect the electrical connector to the wiper switch. Connect the cruise control connector if equipped.



2. Install the wiper switch by snapping it into the switch housing.

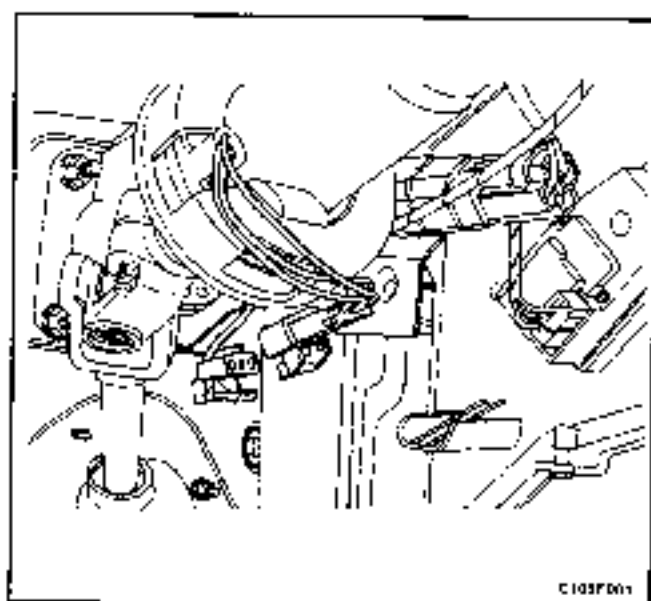


3. Install the upper and the lower steering column cover panels. Install the upper and the lower steering column cover panel screws.

### Tighten

Tighten the upper and the lower steering column cover panel screws to 3 Nm (27 lb-in)

4. Connect the negative battery cable.



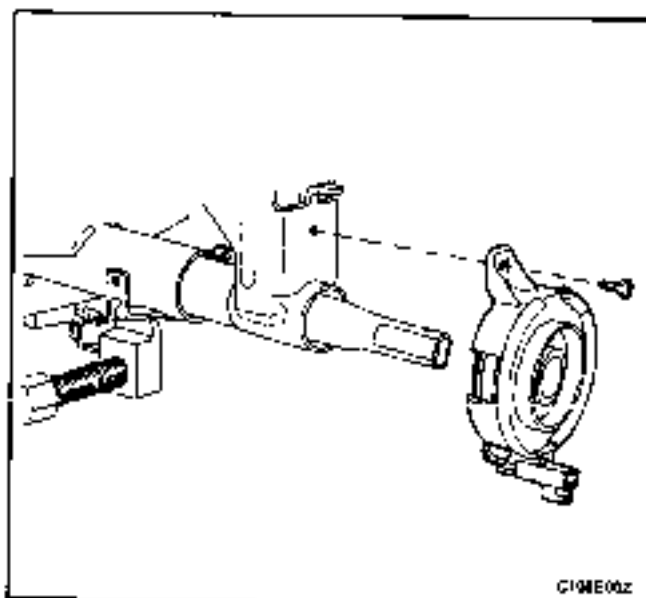
C103F001

## STEERING WHEEL ROTATION SENSOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the upper and the lower instrument trim panels. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the steering wheel rotation sensor electrical connector.
4. Remove the intermediate shaft from the steering column to allow removal of the steering wheel rotation sensor. Refer to "Steering Column" in this section.
5. Remove the retaining screw from the steering wheel rotation sensor.
6. Remove the steering wheel rotation sensor.



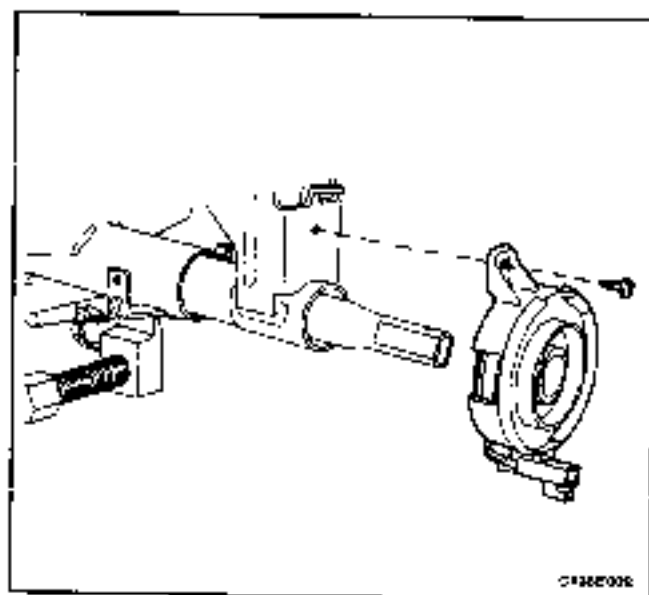
C104E002

### Installation Procedure

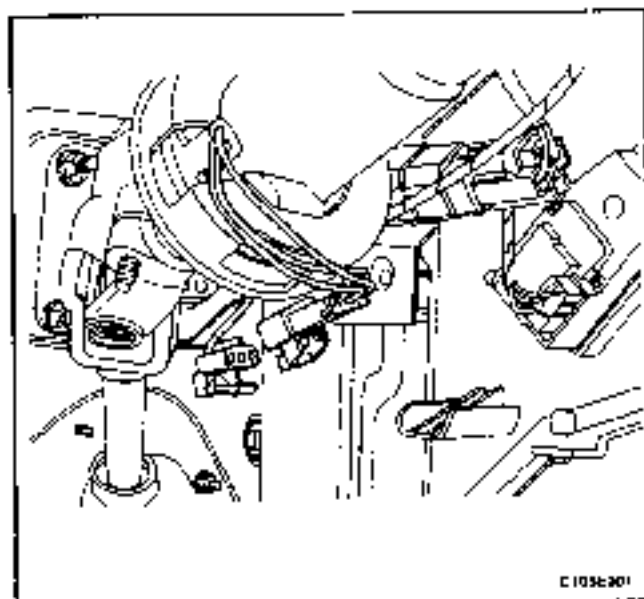
1. Install the steering wheel rotation sensor with the retaining screw.

#### Tighten

Tighten the steering wheel rotation sensor retaining screw to 2 N·m (18 lb-in).



C104E003



2. Install the intermediate shaft onto the steering column. Refer to "Steering Column" in this section.
3. Connect the steering wheel rotation sensor electrical connector.
4. Install the upper and the lower instrument trim panels. Refer to Section 9E, Instrumentation/Driver Information.
5. Connect the negative battery cable.

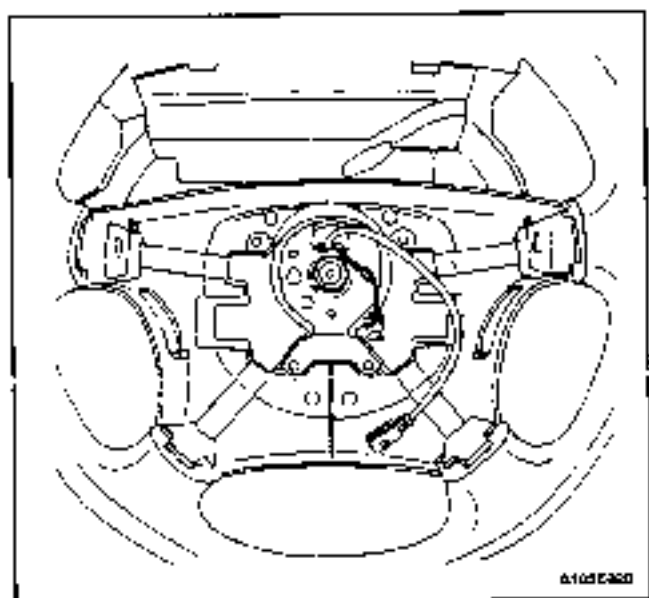
## STEERING WHEEL

### Tools Required

KM-210-A Steering Wheel Puller

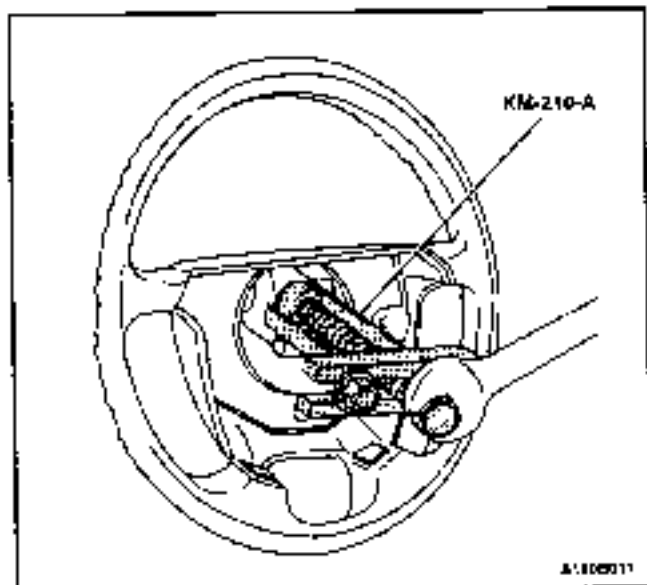
### Removal Procedure

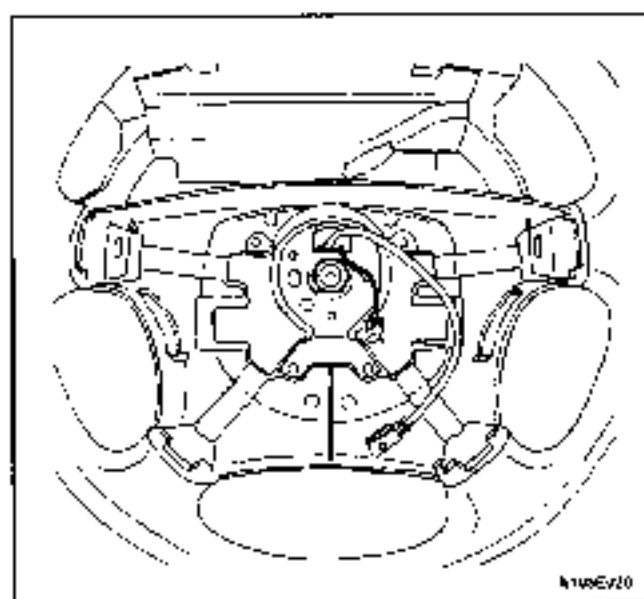
1. Disconnect the negative battery cable.
2. Remove the SIR module. Refer to Section 8B, Supplemental Inflation Restraints.
3. Remove the steering wheel nut and the retaining clip.



**Important:** In order to install the steering wheel correctly, match-mark the steering column shaft to the steering wheel.

4. Remove the steering wheel using the steering wheel puller KM-210-A.
5. Unclip the contact ring from the steering wheel, if necessary.





### Installation Procedure

1. Clip the contact ring on the steering wheel, if necessary.

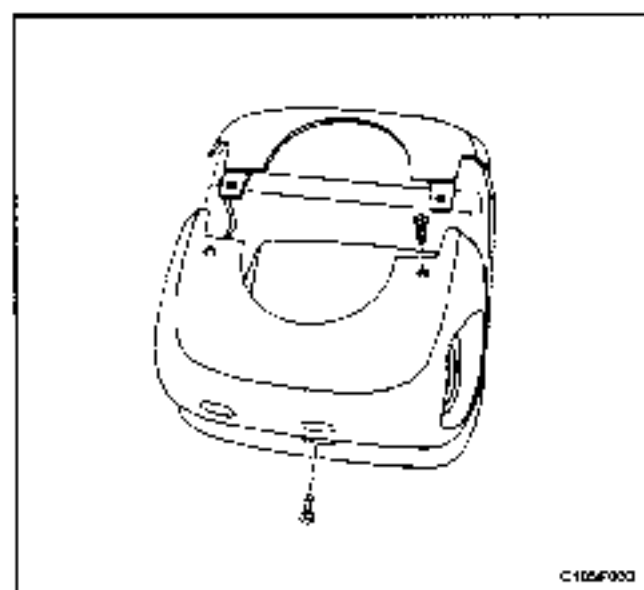
**Important:** In order to correctly install the steering wheel, match-mark the steering column shaft to the steering wheel.

2. Align the match marks on the steering wheel and the steering column shaft. Turn the signal canceling cam on the wheel to the left.
3. Install the retaining clip and the steering wheel nut.

### Tighten

Tighten the steering wheel nut to 23 N•m (17 lb-ft).

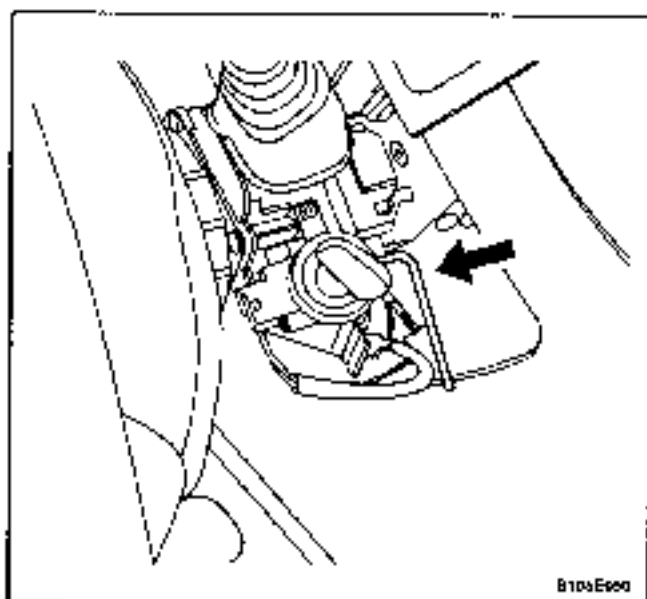
4. Bend the tabs to secure the retaining clip.
5. Install the SIR module. Refer to Section 8B *Supplemental Inflatable Restraints*.
6. Connect the negative battery cable.



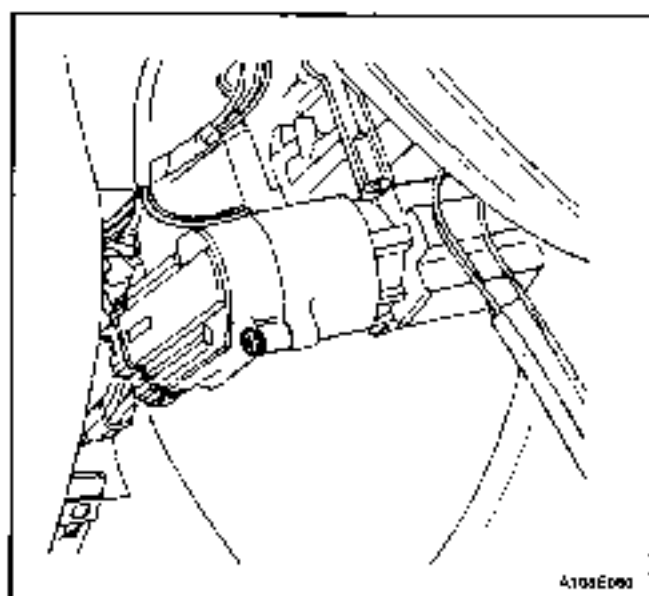
### IGNITION LOCK CYLINDER AND SWITCH

#### Removal Procedure

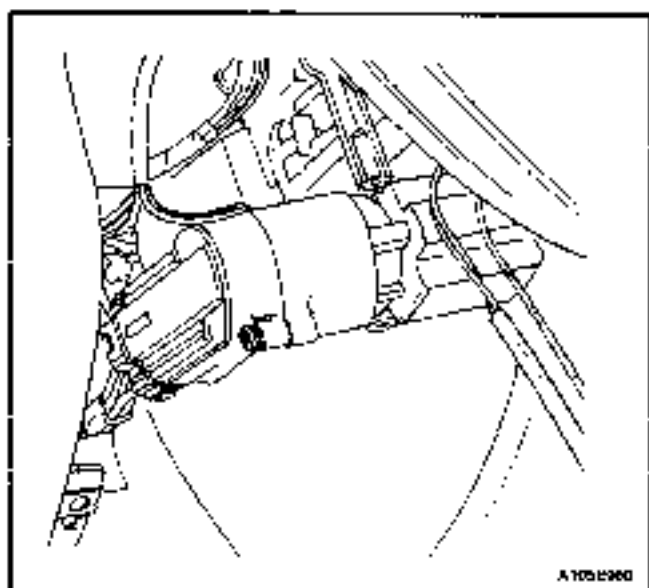
1. Disconnect the negative battery cable.
2. Remove the upper and the lower steering column cover panel by removing the screws.



3. With the key in the ignition turned to the position designated ACC, remove the lock cylinder by pressing down the detent spring and pulling the lock cylinder out of the switch cylinder housing.



4. Remove the ignition switch retaining screw.
5. Disconnect the wiring and remove the ignition switch.



### Installation Procedure

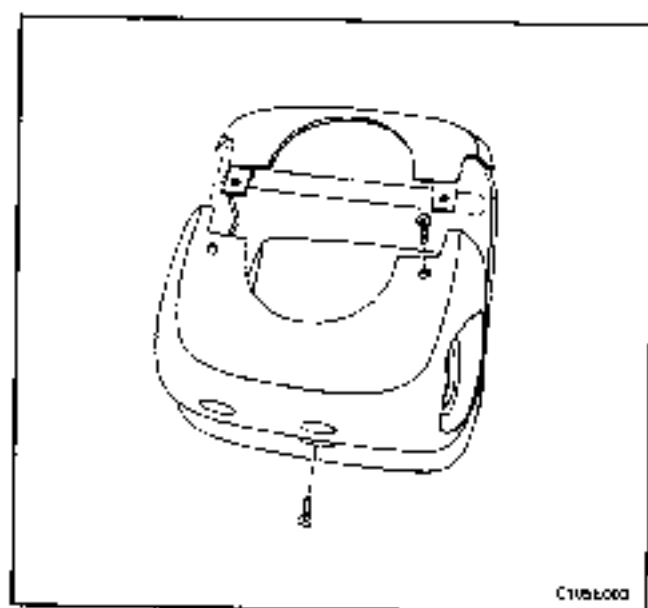
1. Install the ignition switch with the ignition switch retaining screw.

#### Tighten

Tighten the ignition switch retaining screw to 2 N•m (18 lb-in).

2. Connect the wiring to the ignition switch.





3. Install the lock cylinder.
4. Install the upper and the lower steering column cover panel with the screws.

### Tighten

Tighten the upper and the lower steering column cover panel screws to 3 N•m (27 lbf•in).

5. Connect the negative battery cable.

## STEERING COLUMN

(Left-Hand Drive Shown, Right-Hand Drive Similar)

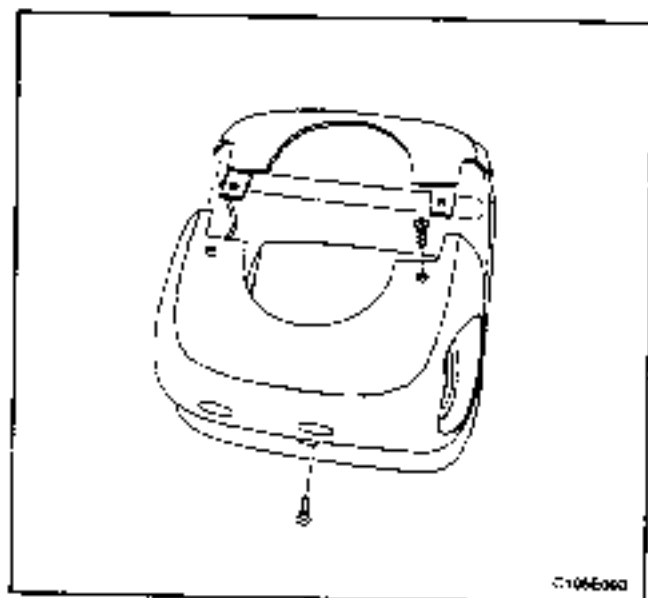
**Important:** Remove the steering column only if the following conditions exist:

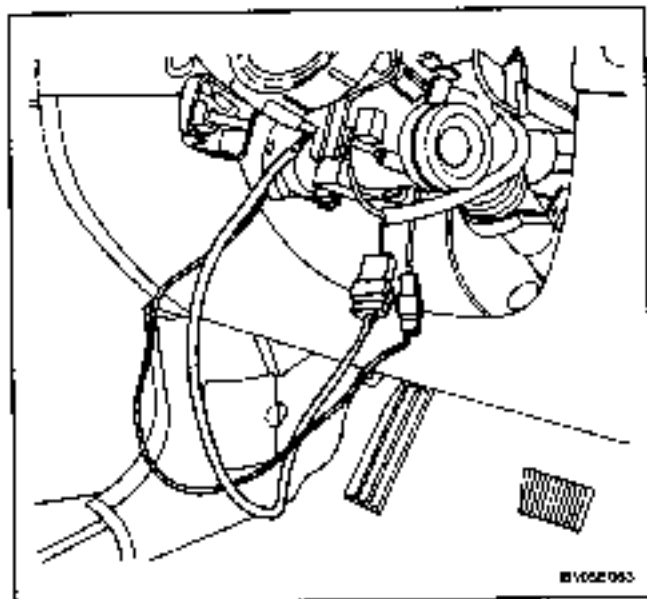
- The steering column requires replacement.
- The steering and the ignition lock housing require replacement.
- Another operation requires the removal of the steering column.

**Notice:** The steering column is extremely susceptible to damage after it has been removed from the vehicle. Dropping the column assembly on its end or hammering the end of the steering shaft can collapse the steering shaft or loosen the plastic injectors which maintain column rigidity. Leaning on the column can cause it to bend or deform. Any of the above damage can impair the column's collapsible design. If it is necessary to remove the steering wheel, use only the specified steering wheel puller.

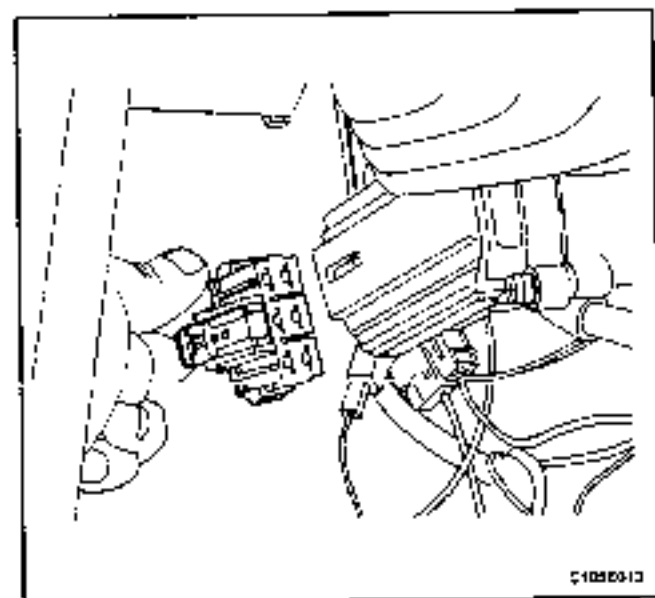
### Removal Procedure

1. Disconnect the negative battery cable and let the vehicle sit for 1 minute to deactivate the airbag.
2. Remove the the lower instrument trim panels. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Remove the switch levers. Refer to "Turn Signal Switch and Lever" and "Wiper Switch and Lever" in this section.
4. Remove the upper and the lower steering column cover panel by removing the screws.
5. Remove the immobilizer module. Refer to section 9T, *Remote Keyless Entry and Anti-theft System*.

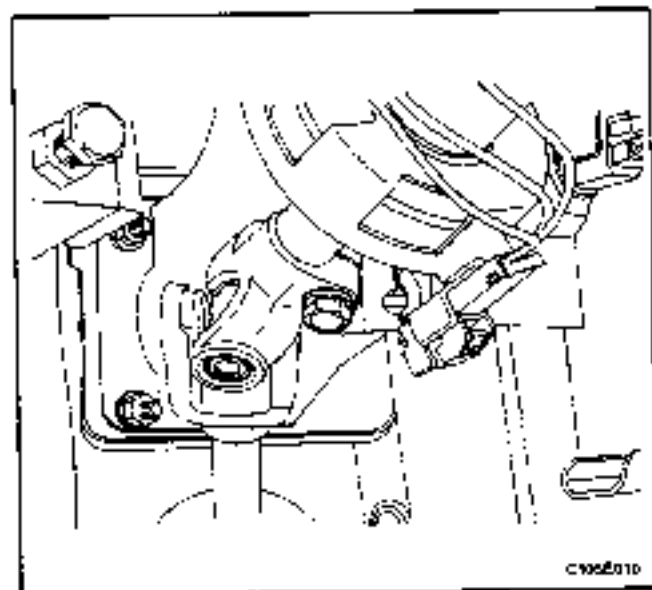




6. Disconnect the airbag electrical connections.

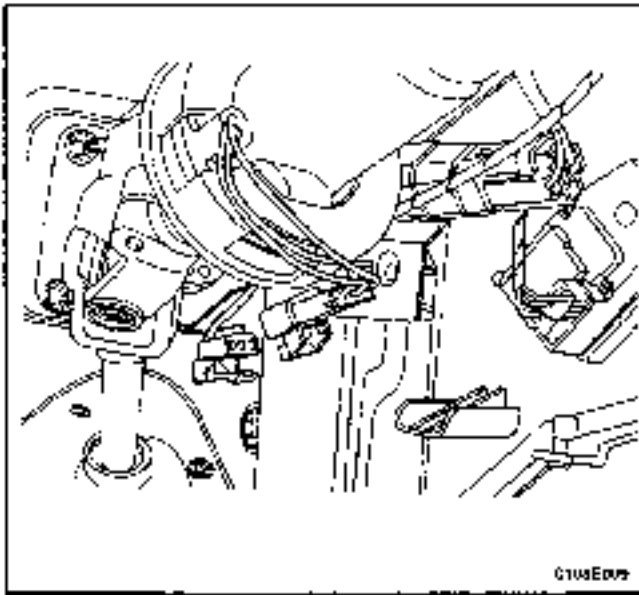


7. Disconnect the ignition switch electrical connection.

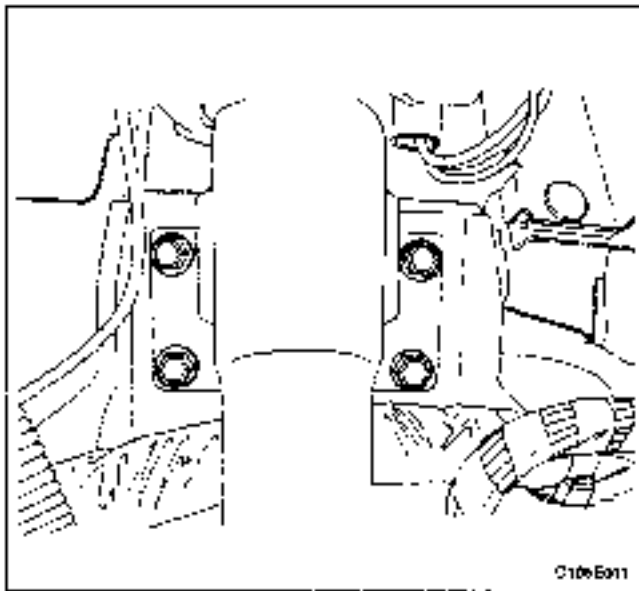


8. Adjust the steering to the straight-ahead position.

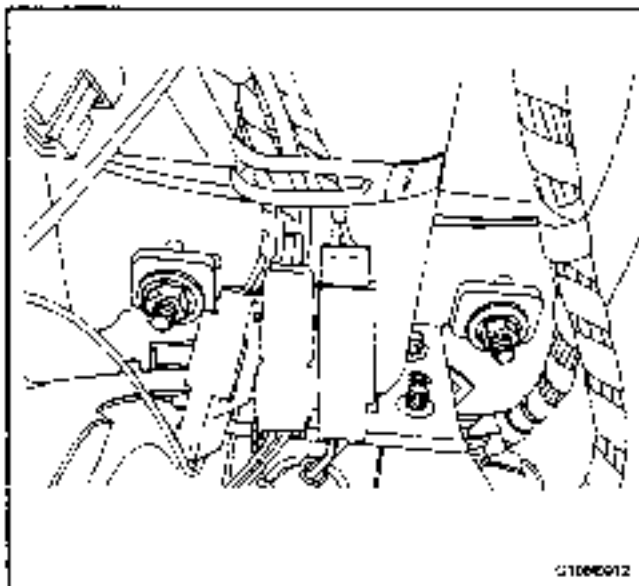
9. Remove the pinch bolt from the intermediate shaft universal joint.



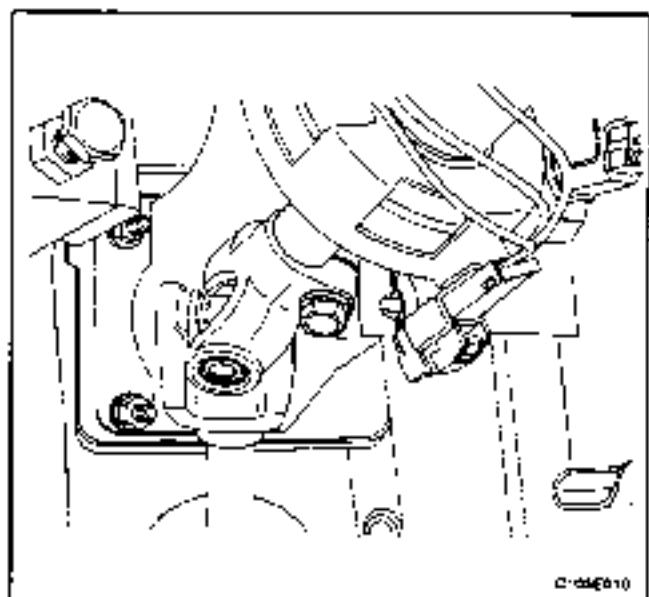
10. Disconnect the speed sensitive steering electrical connector



11. Remove the bolts holding the front bracket of the steering column jacket assembly.



12. Remove the nuts holding the rear bracket of the steering column jacket assembly  
 13. Guide the steering column assembly out of steering shaft flange and carefully lay down the assembly.



### Installation Procedure

**Important:** For proper installation of the steering column, be sure the steering wheel spokes are centered diagonally and pointed downward and the front wheels are positioned in the straight-ahead position.

1. Carefully guide the steering shaft into the intermediate shaft universal joint.

**Important:** Provide support for the steering column assembly until the mounting nuts are fastened. Do not let the steering column assembly hang unsupported.

2. Install the pinch bolt into the non-threaded hole of the flange.

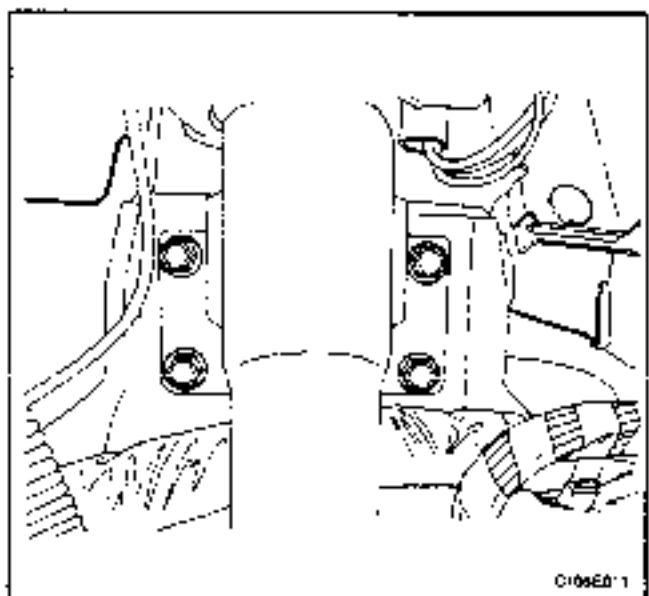
#### Tighten

Tighten the steering shaft universal joint pinch bolt to 25 N•m (18 lb-ft).

3. Install the bolts for the front bracket of the steering column jacket assembly.

#### Tighten

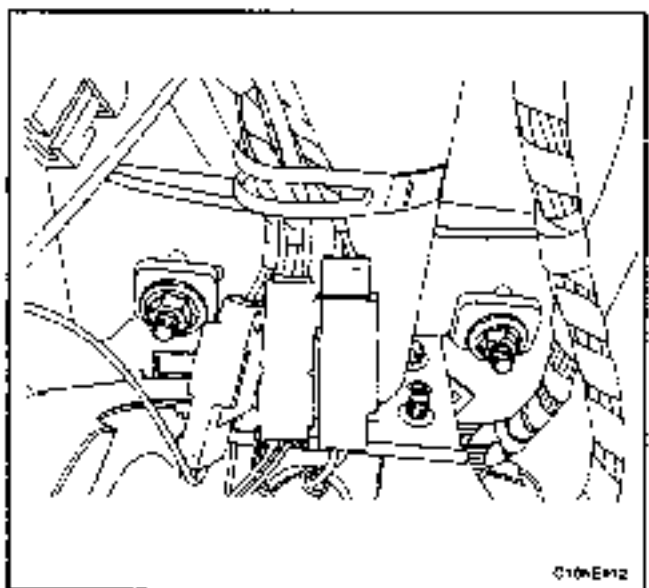
Tighten the steering column jacket assembly front bracket bolts to 22 N•m (16 lb-ft).

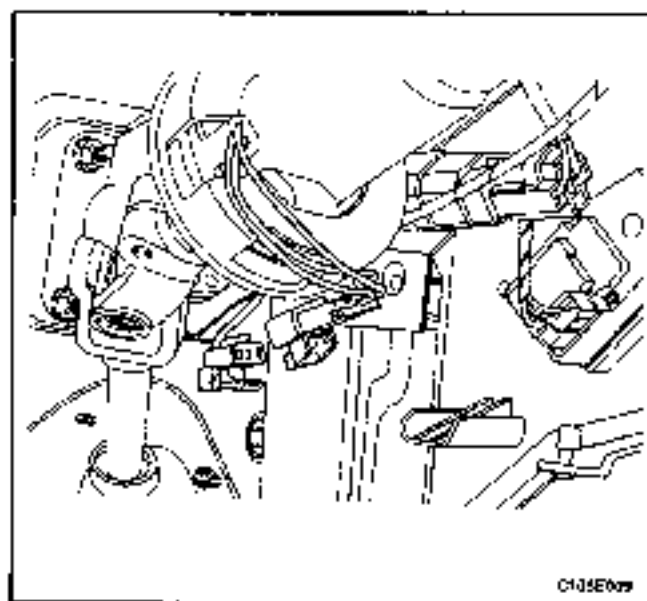


4. Install the nuts for the rear bracket of the steering column jacket assembly.

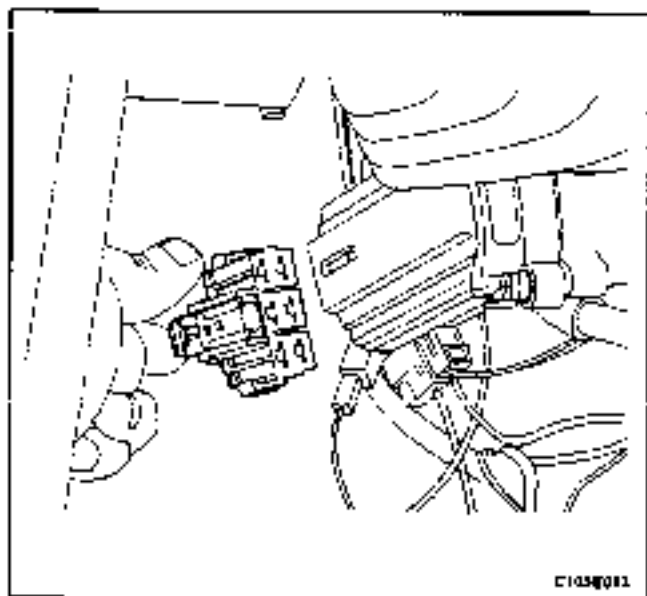
#### Tighten

Tighten the steering column jacket assembly rear bracket nuts to 22 N•m (16 lb-ft).

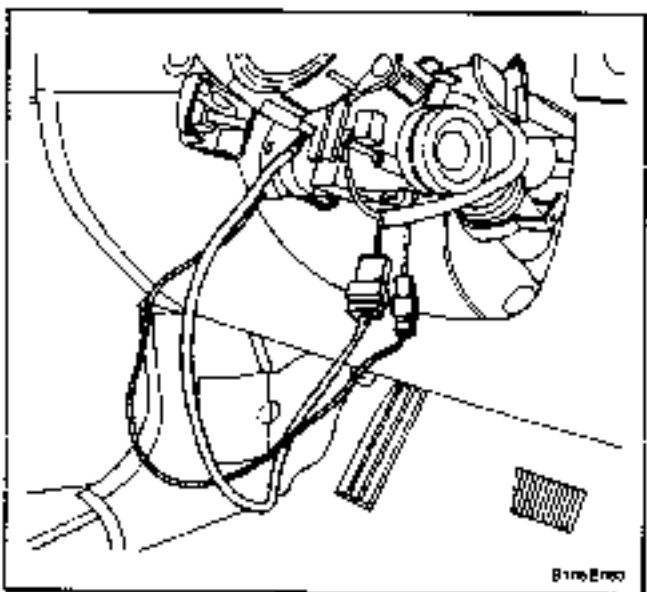




5. Connect the speed sensitive steering electrical connector.



6. Connect the ignition switch electrical connection.



7. Connect the airbag electrical connections.
8. Install the switch levers. Refer to "Turn Signal Switch and Lever" and "Wiper Switch and Lever" in this section.
9. Install the immobilizer module. Refer to section 9T, Remote Keyless Entry and Anti-theft System.
10. Install the lower instrument trim panels. Refer to Section 9E, Instrumentation/Driver Information.
11. Install the upper and the lower steering column cover panel with the screws.

### Tighten

Tighten the upper and the lower steering column panel screws to 3 N·m (27 lb·in).

12. Inspect the steering wheel in a straight-ahead position. Refer to Section 6C, Power Steering Gear.
13. Connect the negative battery cable.

## UNIT REPAIR

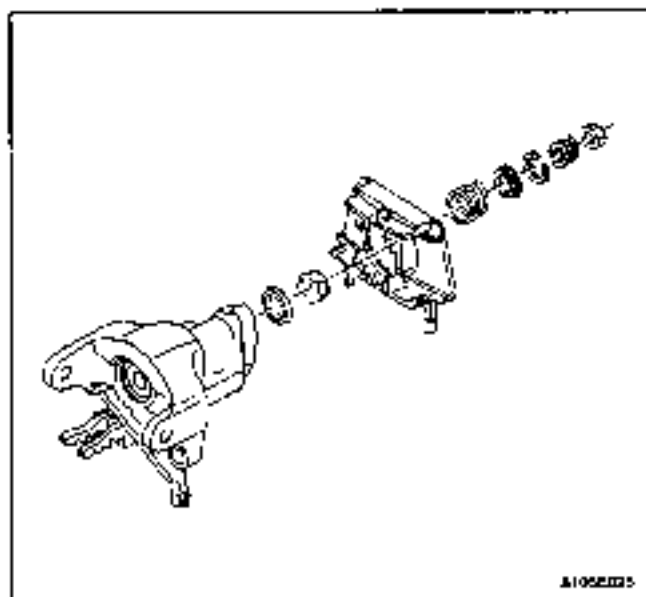
### TILT STEERING COLUMN

#### Tools Required

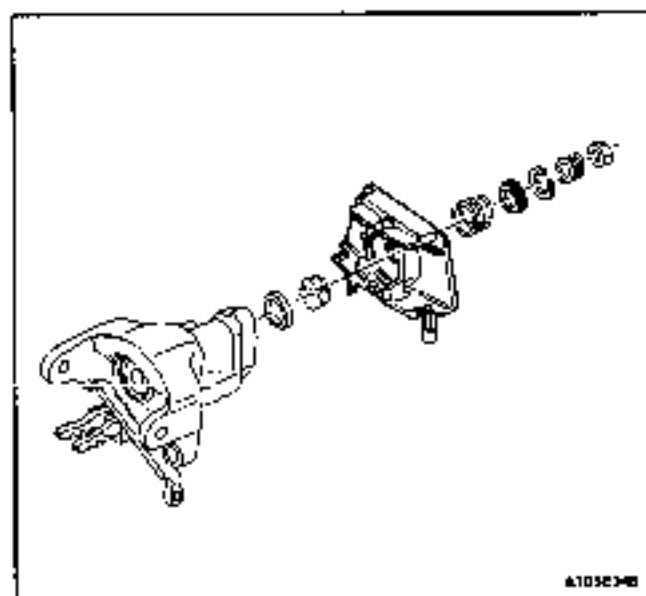
- J-36667 Lock Plate Adapter (Tilt)
- J-23653-A Lock Plate Compressor
- J-21854-01 Pivot Pin Remover

#### Disassembly Procedure

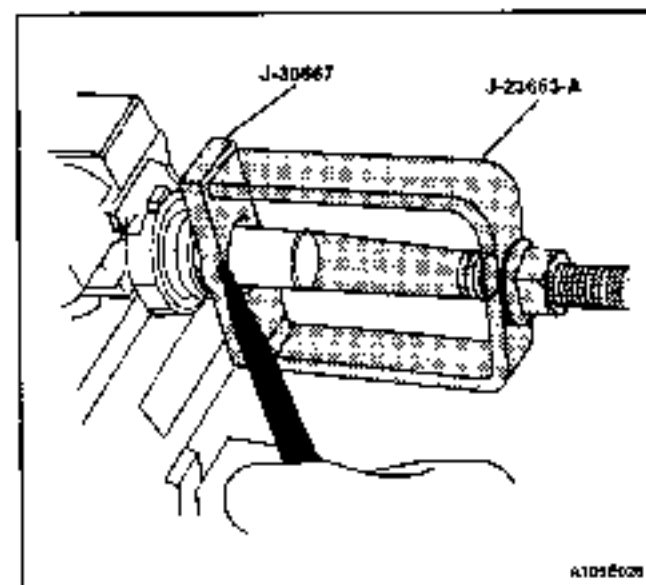
1. Remove the steering column from the vehicle. Refer to "Steering Column" in this section.
2. Remove the steering wheel from the steering column. Refer to "Steering Wheel" in this section.
3. Pull the canceling cam spring from the upper end of the shaft assembly, if it has not been previously removed.
4. Remove the turn signal switch housing screws. Remove the turn signal switch housing from the steering column housing.



A105E025

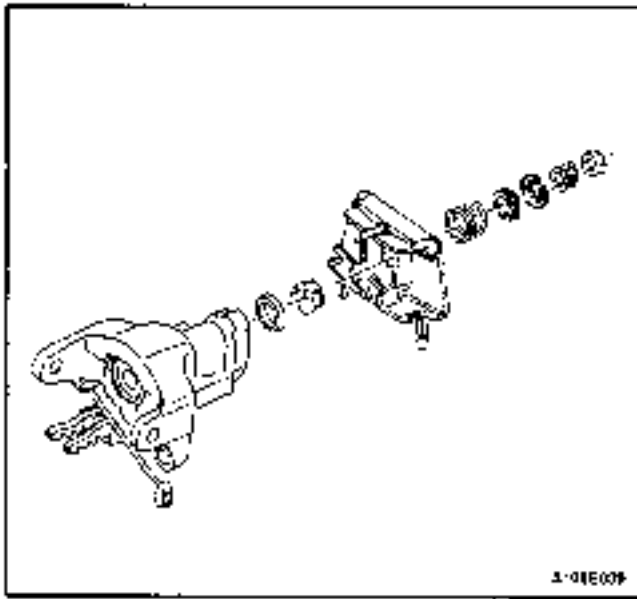


A105E048

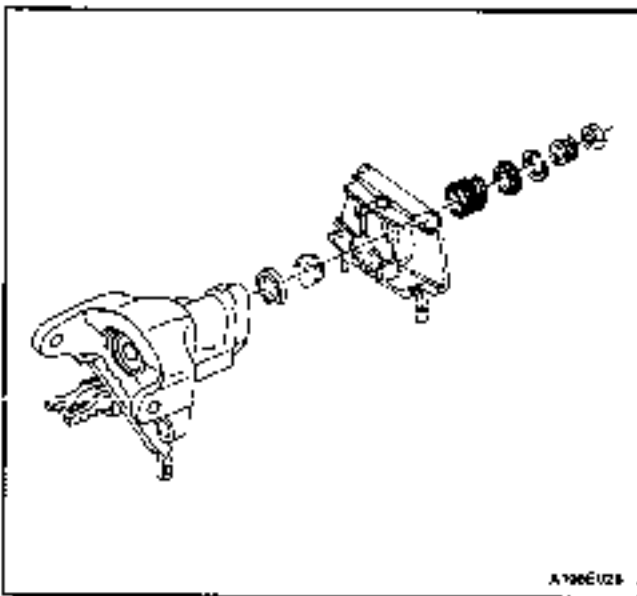


A105E028

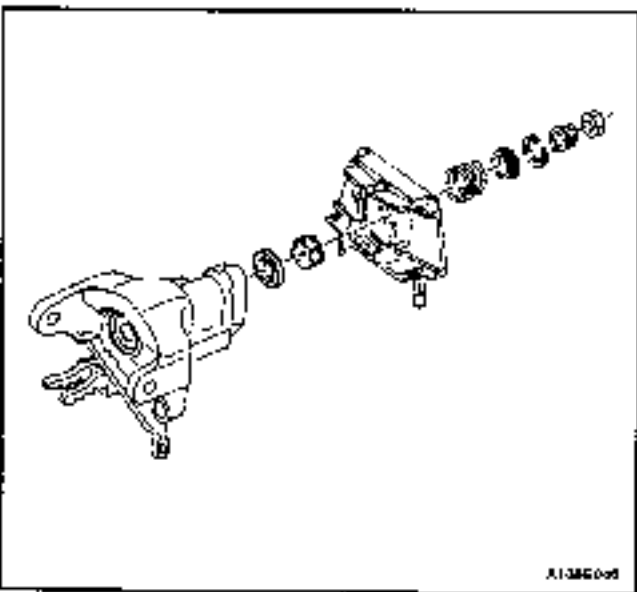
5. Compress the spring retainer and upper bearing spring with the tilt lock plate adapter J-36667 and the lock plate compressor J-23653-A.



6. Remove the retaining ring.

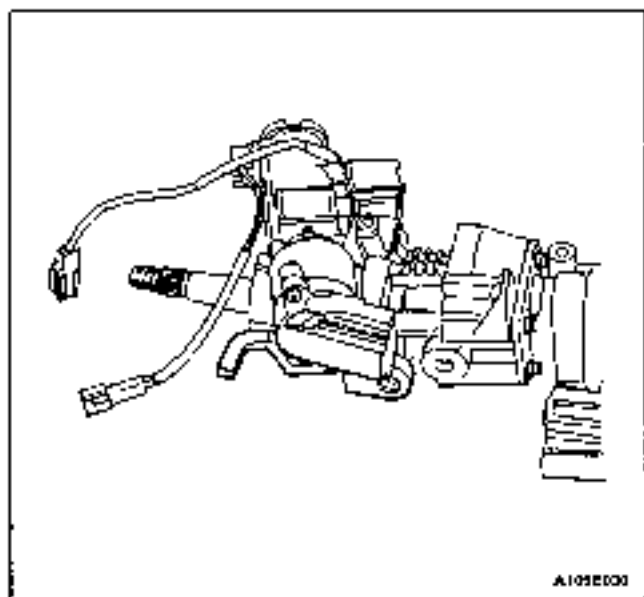


7. Remove the spring retainer and the upper bearing spring.

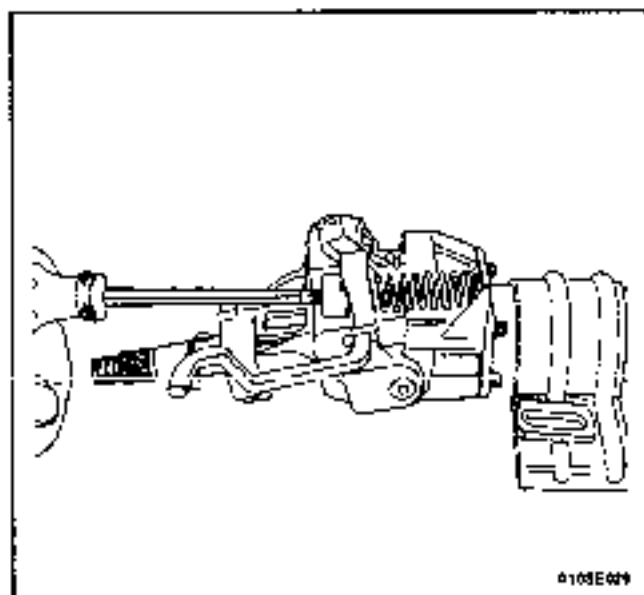


8. Remove the inner race seat and the inner race.

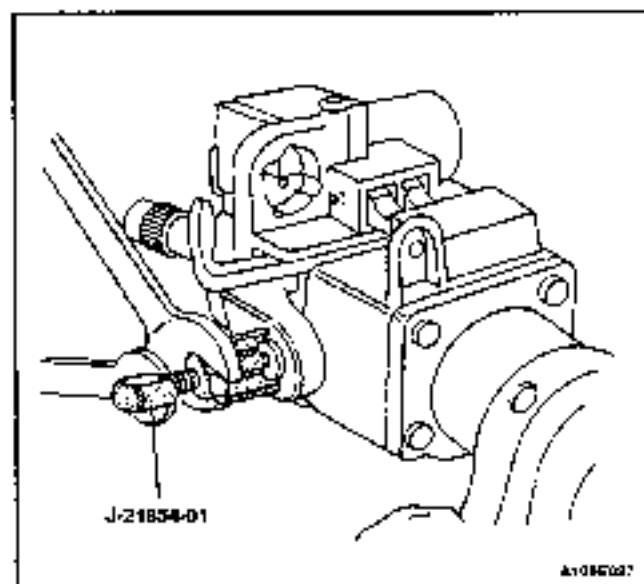
## 6E-22 STEERING WHEEL AND COLUMN



9. Pull the tilt level on the column housing assembly and tilt the column all the way up.

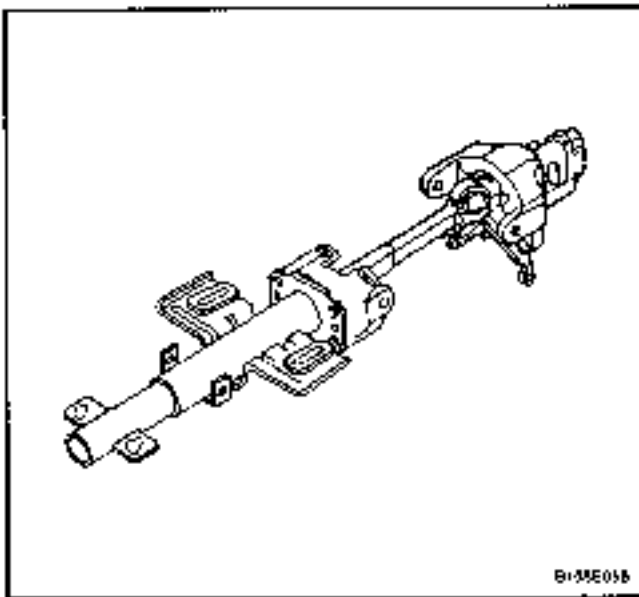


10. Insert a Phillips screwdriver into the square opening at the bottom of the spring retainer. Push and turn left to release the spring retainer and the wheel-tilt spring.
11. Remove the spring retainer and the wheel-tilt spring.



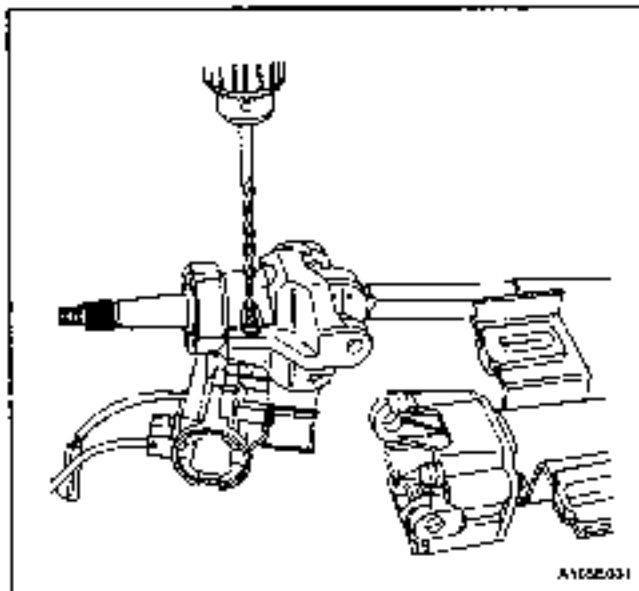
12. Remove the two pivot pins using the pivot pin remover J-21854-01.





B1ME056

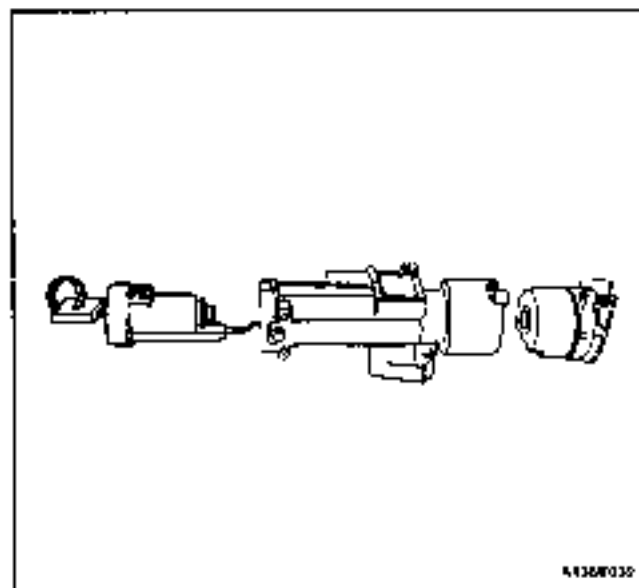
- 13 Place the lock cylinder in the ACC position
- 14 Pull the lift lever to release the column housing. Remove the column housing and the steering shaft from the housing support.



A105E031

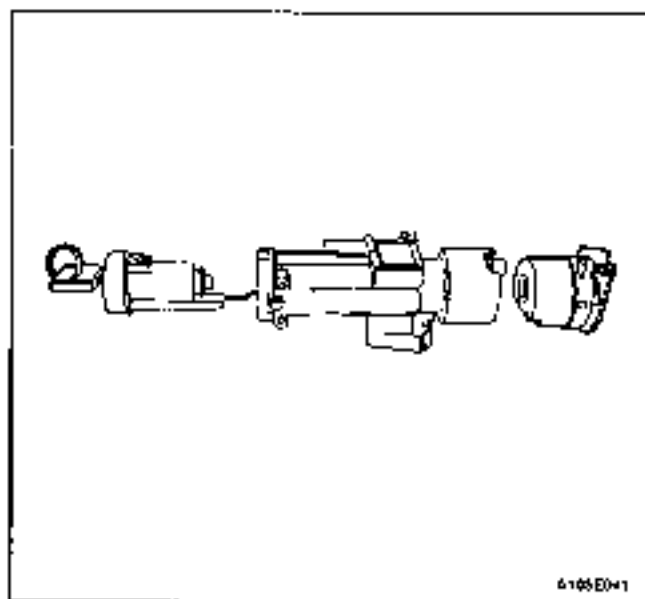
- 15 Remove the shear bolts, the shear bolt washers, and the ignition switch housing from the steering column housing as follows:
  - 15.1 Use a metal punch to start the drill head
  - 15.2 Drill off the head of the shear bolts down to the steel shear bolt washers with a 6.5 mm (1/4 inch) drill bit.
  - 15.3 Separate the washers and the ignition switch housing from the column housing
  - 15.4 Remove the threaded end of the shear bolts from the ignition switch housing with locking pliers

**Important:** After drilling and removing the threaded end of the shear bolts, all the metal shavings must be cleaned from all the parts

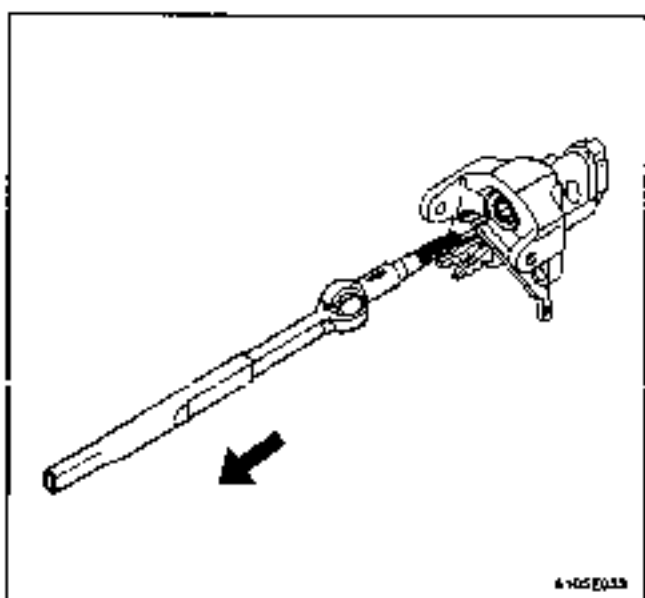


A136W030

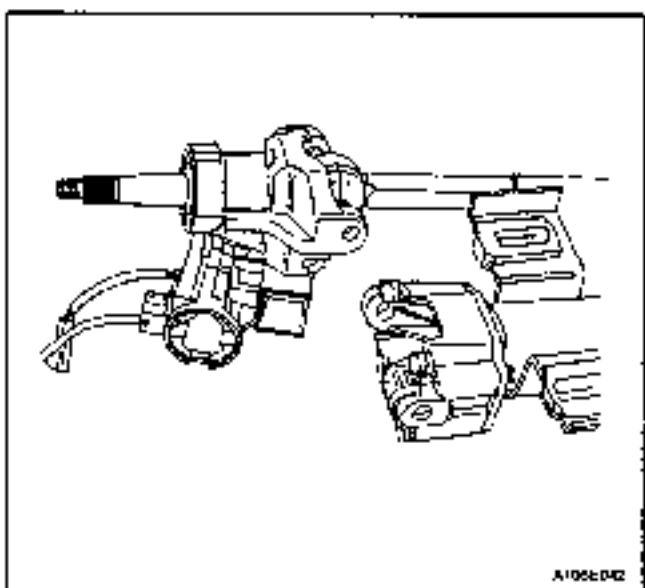
- 16 Remove the lock cylinder from the ignition switch housing by pushing the lock cylinder release tab.



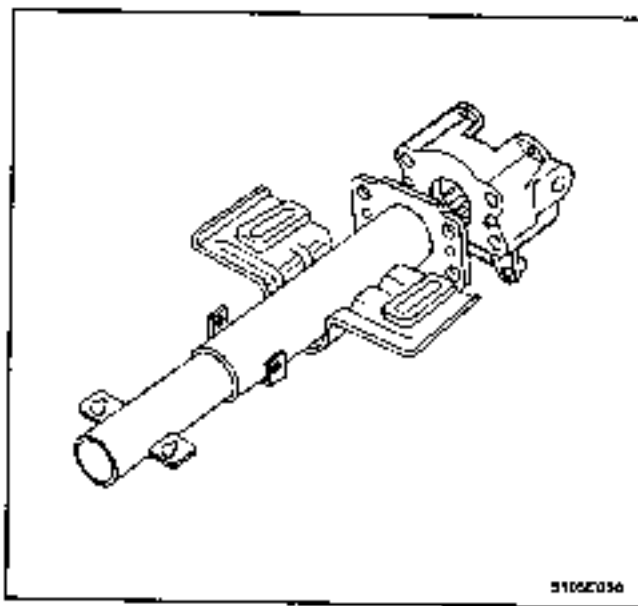
17. Remove the ignition switch retaining screw and remove the ignition switch assembly.



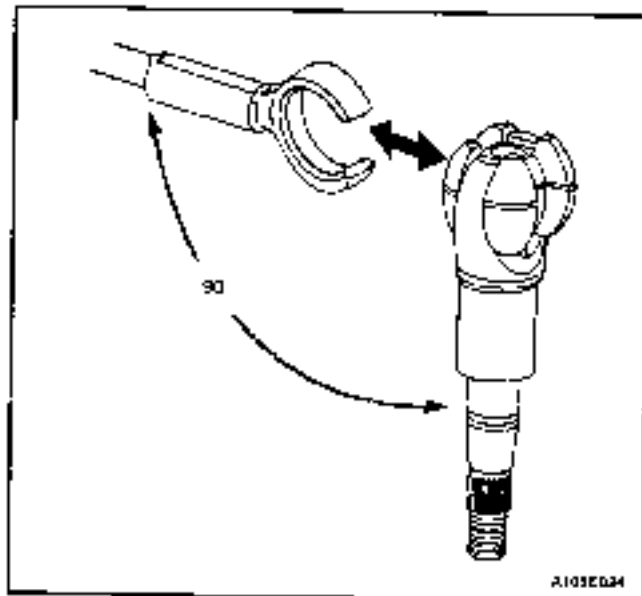
18. Remove the steering shaft assembly from the housing support.



19. Remove the tilt bumpers with a pair of pliers.



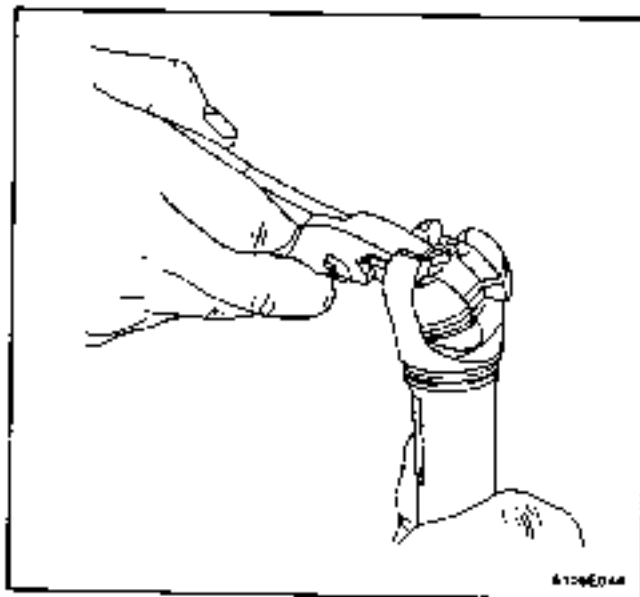
20. Remove the support screws and remove the support housing from the jacket assembly.



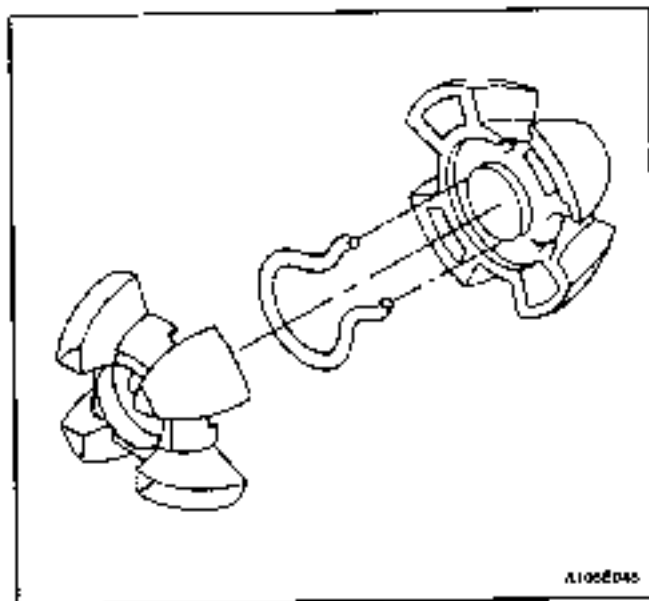
### Disassembly Procedure for the Steering Shaft Assembly

**Important:** Prior to separating the upper shaft from the lower shaft, note the relationship of the upper shaft, with the lock bolt slot at the 12 o'clock position, to the lower shaft pinch ball groove at the 7 o'clock position. Refer to this orientation for proper assembly.

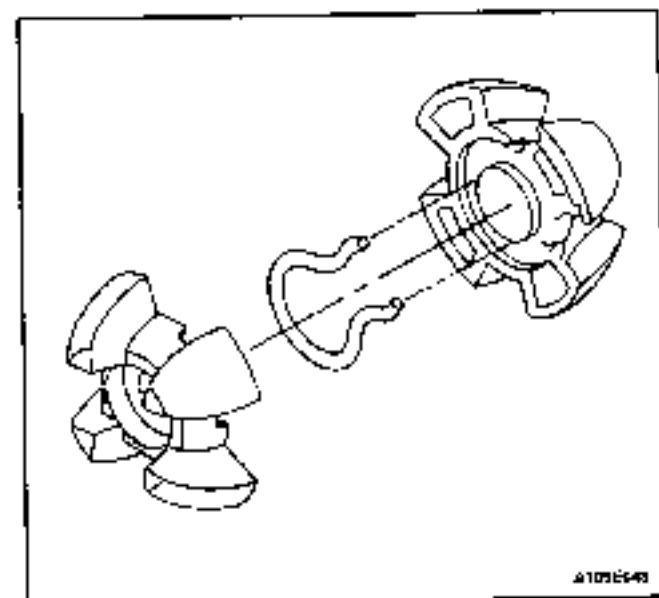
1. Position the upper shaft 90 degrees to the lower shaft and separate the two parts.



2. Rotate the centering sphere 90 degrees and remove it from the upper shaft.

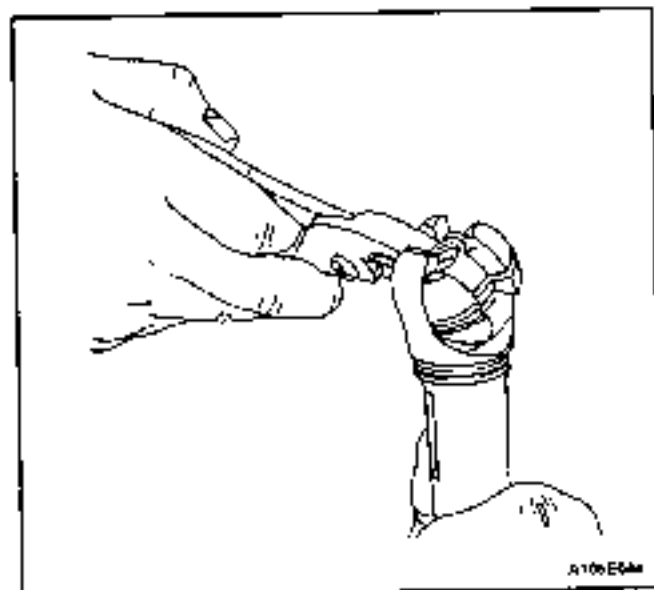


3. Separate the sphere halves and remove the joint preload spring.

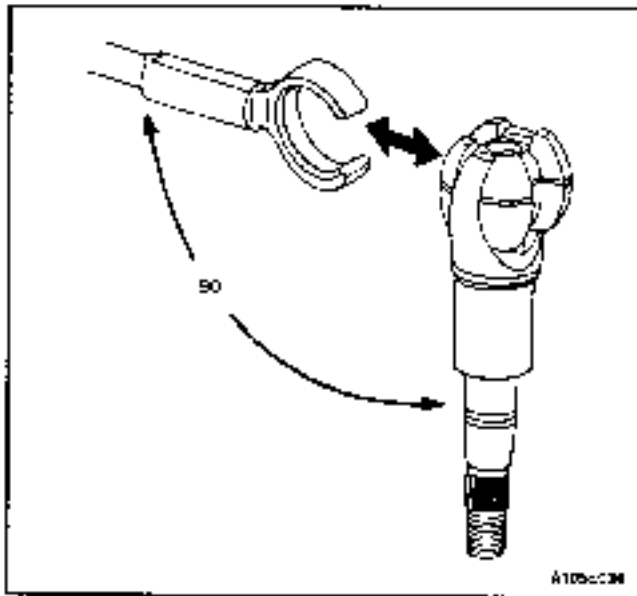


### Assembly Procedure for the Steering Shaft Assembly

1. Lubricate the centering sphere halves and the joint preload spring with lithium grease.
2. Place the joint preload spring between the sphere halves with the ends of the spring in the notches.



3. Lubricate the sphere end of the upper shaft with lithium grease.
4. Place the sphere into the upper shaft and rotate the sphere 90 degrees.



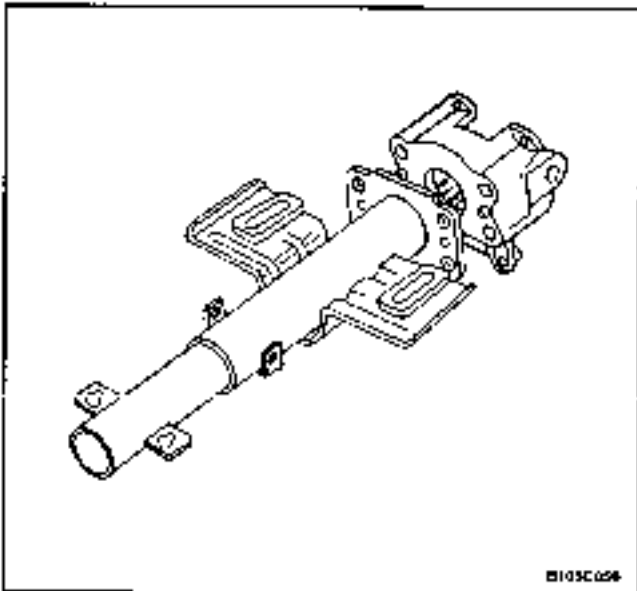
5. Lubricate the sphere end of the lower shaft with lithium grease.

**Important:** To insure proper operation, the upper shaft and the lower shaft must be aligned correctly when they are connected.

6. Place the lock ball slot on the upper shaft at the 12 o'clock position.

7. Place the pinch ball groove near the end of the lower shaft at the 7 o'clock position.

8. Connect the upper shaft to the lower shaft.



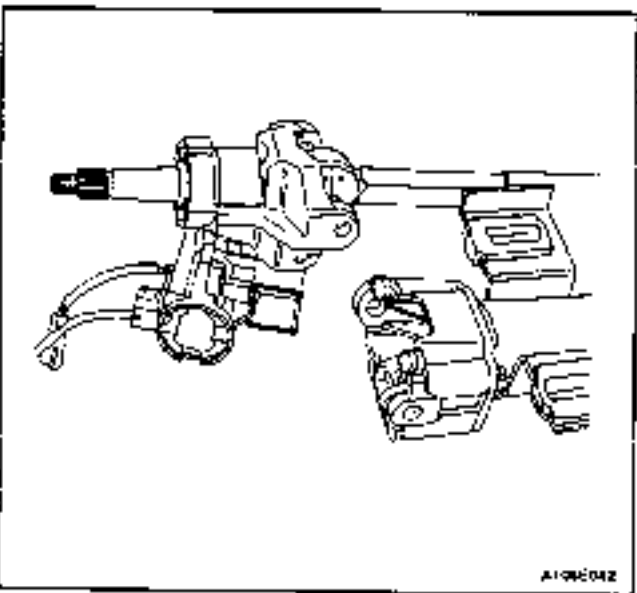
### Assembly Procedure

**Important:** All fasteners in the following steps must be seated firmly before being tightened to specifications.

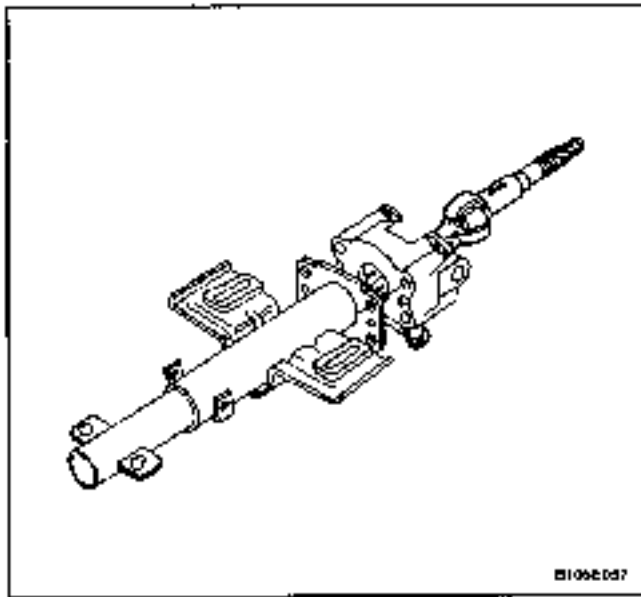
1. Connect the support housing to the jacket assembly with the support screws.

#### Tighten

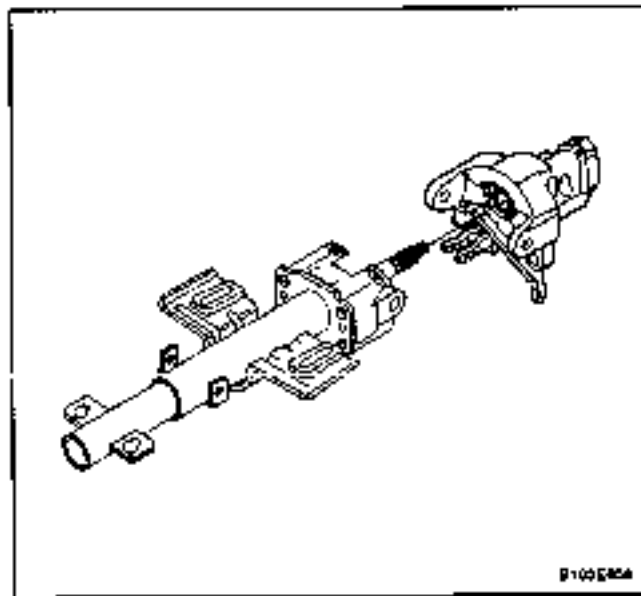
Tighten the support housing screws to 16 N·m (12 lb-ft).



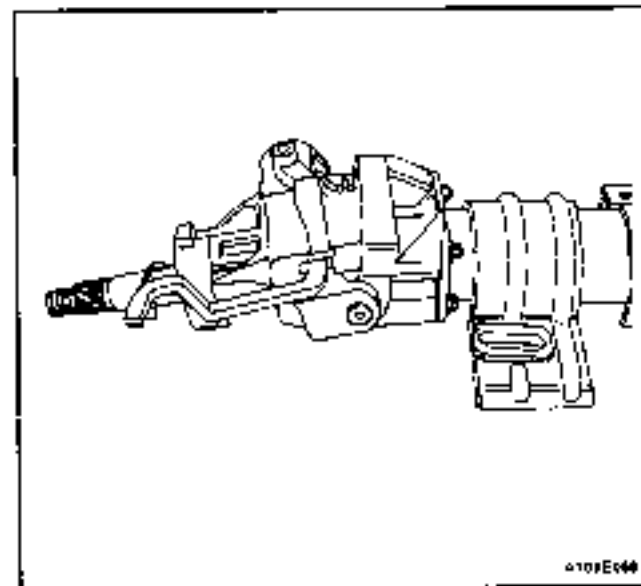
2. Connect the fit bumpers to the support housing and snap them in place.



- 3 Slide the steering shaft assembly into the support housing.

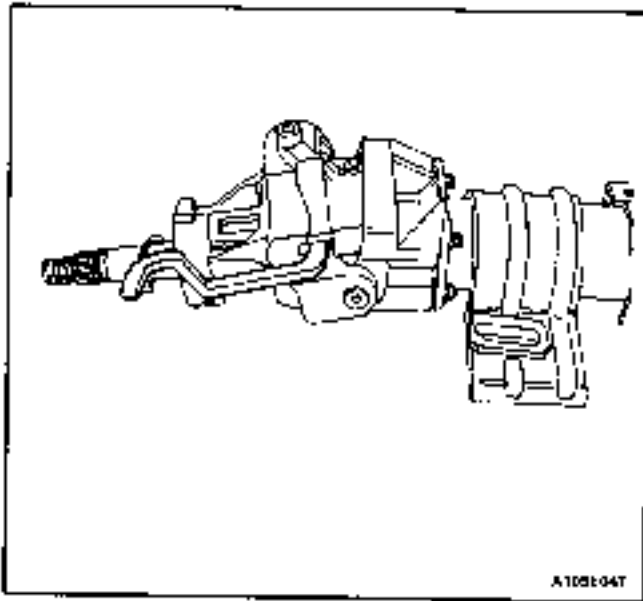


- 4 Lubricate both bearings in the column housing with lithium grease. Slide the column housing onto the shaft assembly and the housing support.

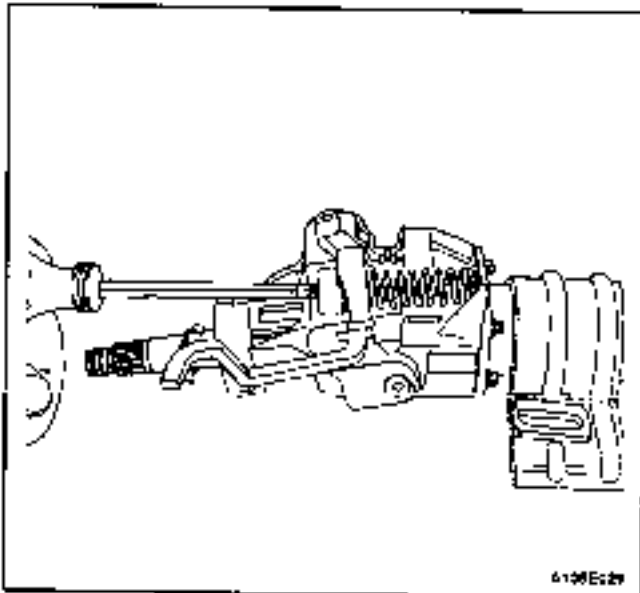


- 5 Lubricate the pivot pins with lithium grease and slide the pins into the housing until the pins are bottomed. Tap the pivot pins in place.

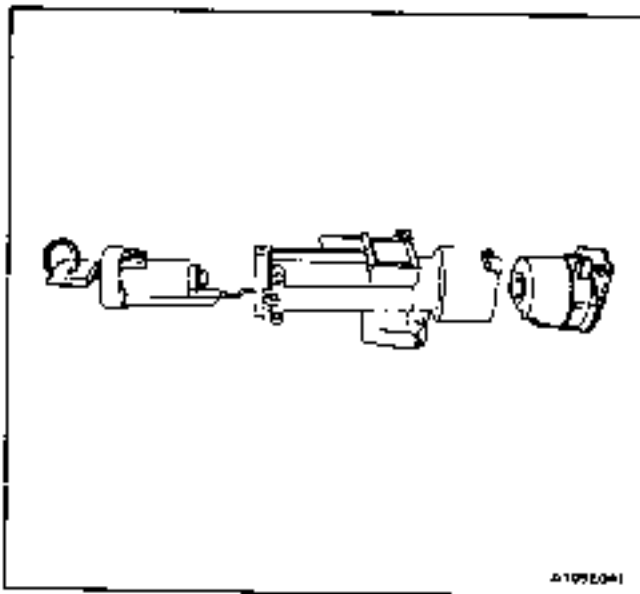
**Important:** The pivot pins must be staked to the column housing after installation. Stake each pin at three equally-spaced locations.



6. Pull the tilt lever on the column housing and tilt the column all the way up.



7. Lubricate the tilt spring with lithium grease.
8. Install the tilt spring and the spring retainer. Be sure the spring engages the locating tab on the support housing. Insert a Phillips screwdriver into the square opening in the spring retainer, push down, and turn right to lock it in place.

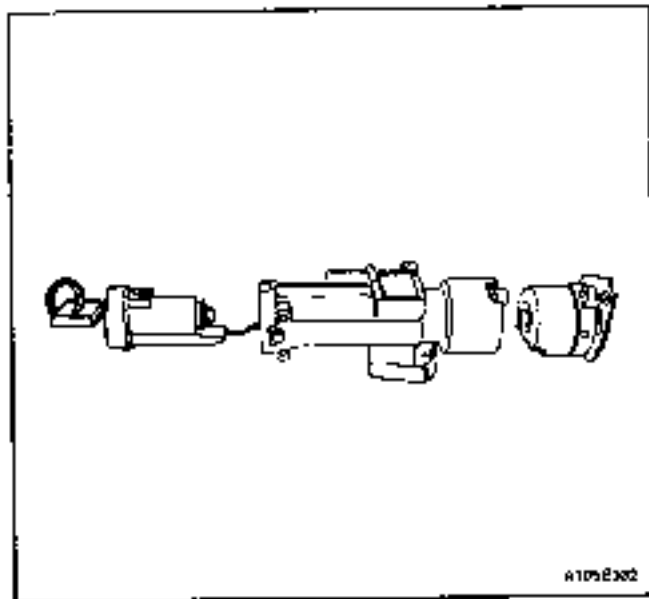


9. Install the ignition switch with the ignition switch retaining screw.

**Tighten**

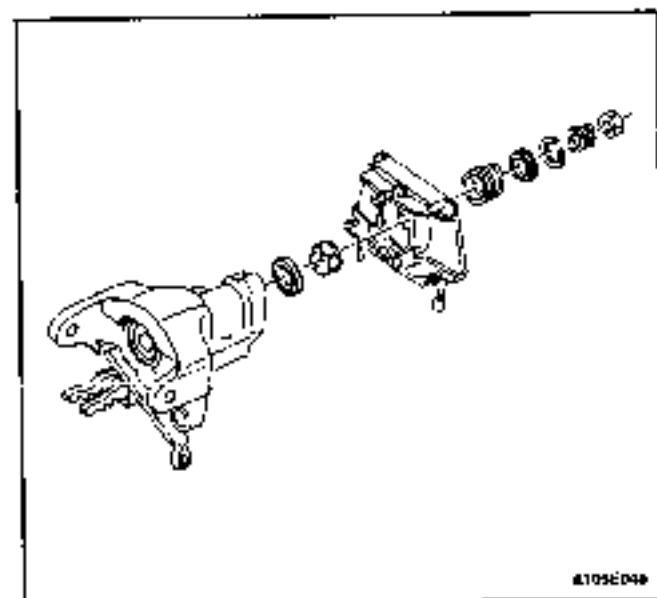
Tighten the ignition switch retaining screw to 2 N•m (18 lb-in).

10. Connect the wiring. Refer to 'Ignition Lock Cylinder and Switch' in this section.



**Important:** To ensure that the tab on the lock cylinder shaft and the slotted opening on the ignition switch are in alignment, the lock cylinder must be in the ACC position prior to installation.

11. Install the lock cylinder into the ignition switch housing.

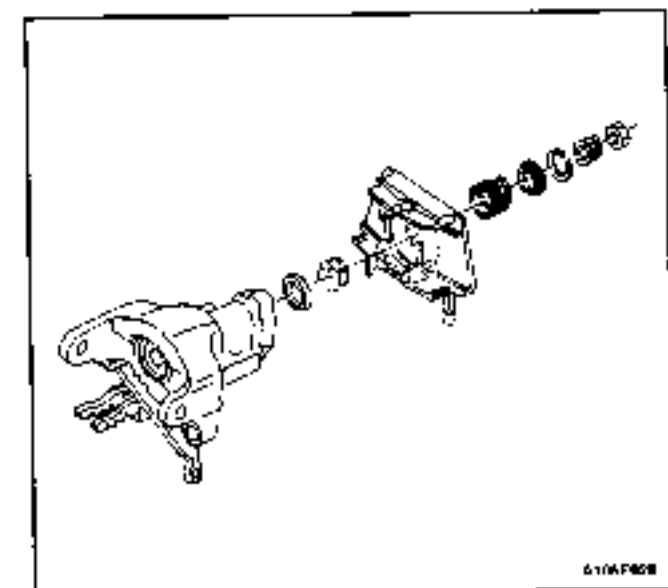


12. Attach the ignition switch housing to the column housing with the shear bolt washers and the shear bolts.

#### Tighten

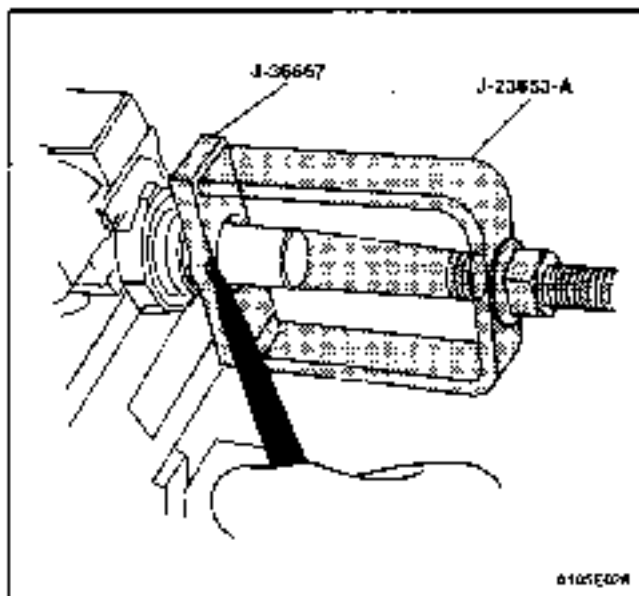
Tighten the ignition switch housing shear bolts until the bolt heads separate from the body, approximately 11 N·m (97 lb-in).

13. Place the lock cylinder in the LOCK position and remove the key.
14. Rotate the steering shaft assembly until the lock bolt engages and locks the steering shaft in position.
15. Install the inner race and the inner race seal.

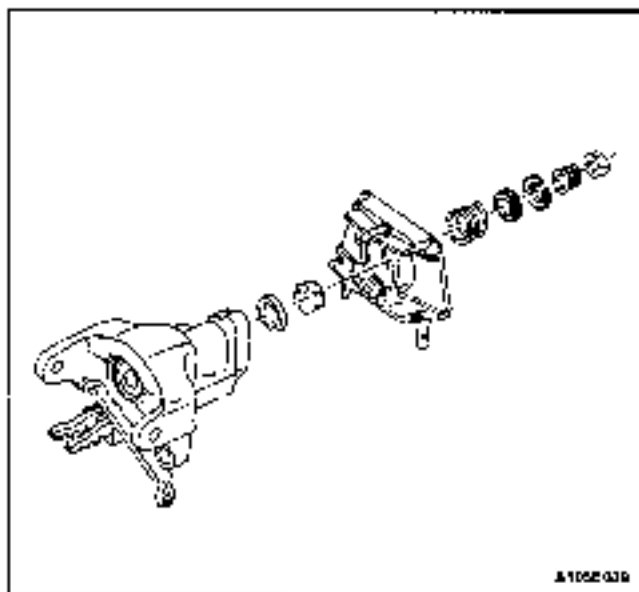


16. Install the upper bearing spring and the spring retainer.

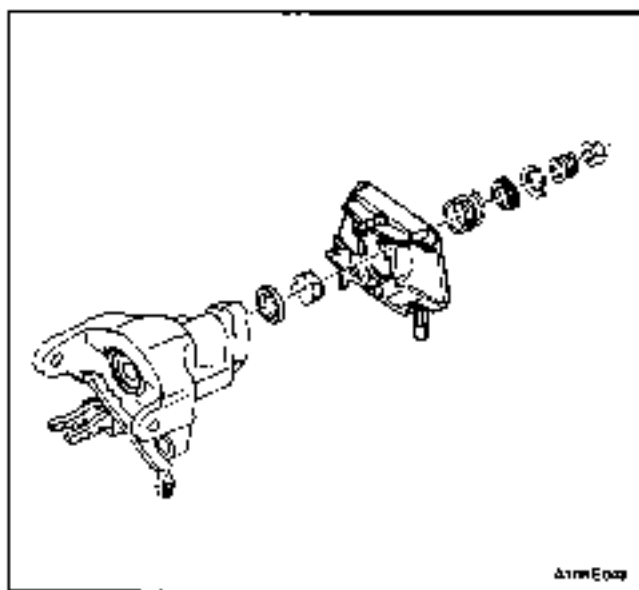




17. Compress the upper bearing spring and the spring retainer with the tilt lock plate adapter J-36667 and the lock plate compressor J-23653-A.



18. Place the retaining ring into the groove on the upper shaft.



19. Connect the turn signal switch housing to the steering column housing with the turn signal switch housing screws.

**Tighten**

Tighten the turn signal switch housing screws to 3 N·m (27 lb-in).

20. Install the steering column into the vehicle. Refer to "Steering Column" in this section.
21. Install the cancelling cam spring and the steering wheel onto the steering column. Refer to "Steering Wheel" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### STEERING WHEEL AND COLUMN

**Caution:** To ensure the energy-absorbing action of the steering column, it is important to use only the specified screws, bolts, and nuts, tightened to the specified torque.

In addition to the steering function, the steering column provides safety and security.

The energy-absorbing column is designed to compress in a front-end collision to lessen the chance of driver injury.

The ignition switch and the lock are mounted on the column, allowing the ignition and steering operations to be locked to inhibit theft of the car.

The column levers trigger the turn signals, the headlight beams, and the windshield washer and wipers.

A tilt steering column uses a spherical joint to allow the steering wheel to tilt up and down. This enables the driver to adjust the steering wheel to a comfortable position.

**Notice:** Apply a thin coat of lithium grease to all friction points when reassembling.

The column may be disassembled and reassembled easily.

### IGNITION SWITCH KEYHOLE LAMP

For description and lamp replacement information, refer to Section 9B, *Lighting Systems*.

### IGNITION KEY REMINDER

The ignition key reminder alerts the driver that the key is still in the ignition when the driver attempts to exit the vehicle.

An internal switch in the ignition lock cylinder supplies battery voltage to the reminder chime module when all of the following conditions are true:

- The key is in the ignition switch.
- The ignition is OFF.
- The driver's door is open.

For information on removal and installation of the reminder chime module, refer to Section 9E, *Instrumentation/Driver Information*.

**HVAC (HEATING, VENTILATION &  
AIR CONDITIONING)**

**CONTENTS**

- SECTION 7B/C    MANUAL CONTROL/SEMIAUTO  
                    TEMPERATURE CONTROL  
                    HEATING, VENTILATION, AND  
                    AIR CONDITIONING SYSTEM**
- SECTION 7D     FULL AUTOMATIC  
                    TEMPERATURE CONTROL  
                    HEATING, VENTILATION, AND  
                    AIR CONDITIONING SYSTEM**



## SECTION 7A

# HEATING AND VENTILATION SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### HEATER TEMPERATURE SPECIFICATIONS

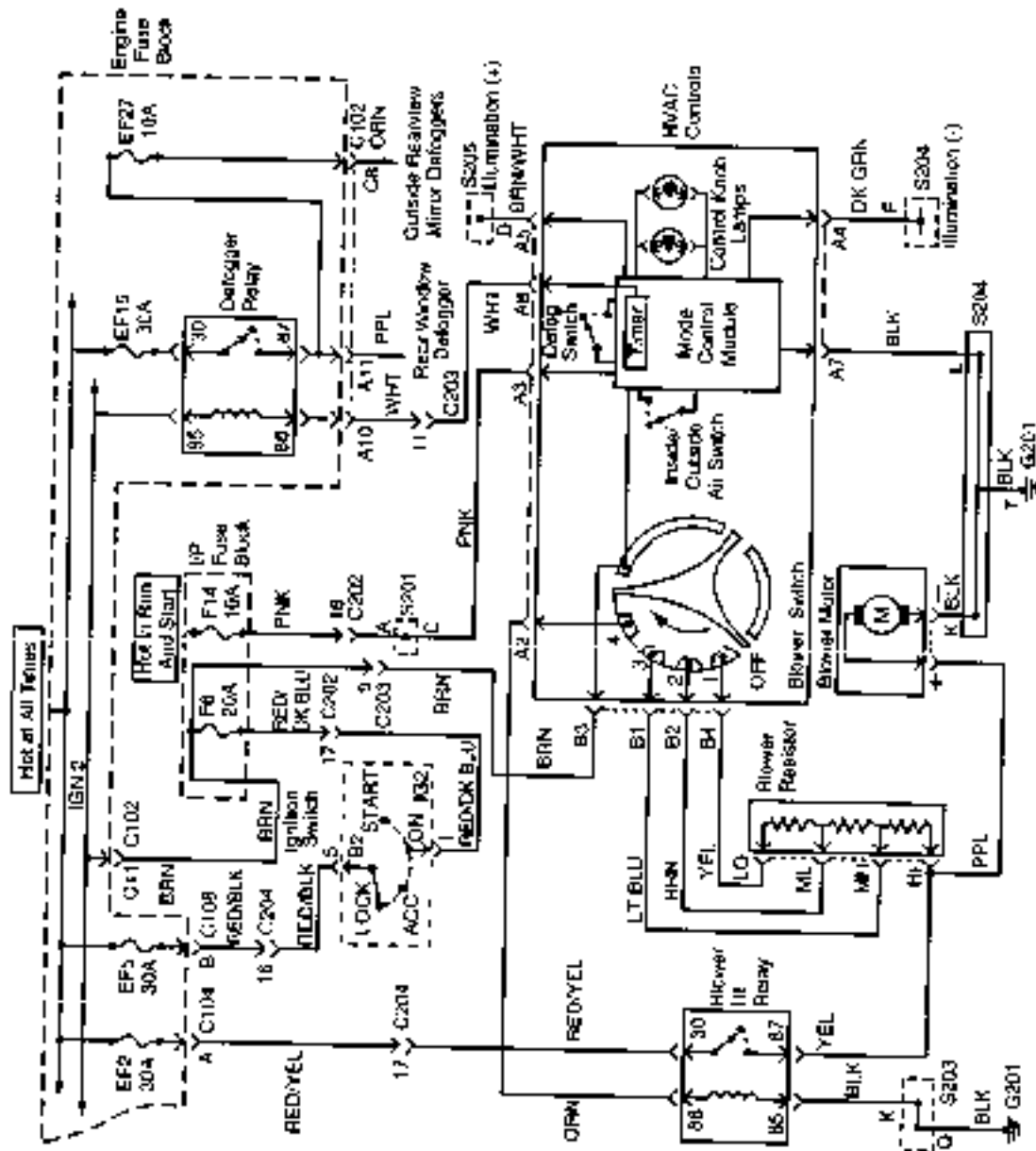
Ambient Air Temperature	Heater Outlet Air Temperature
-18°C (0°F)	54°C (129°F)
-4°C (25°F)	59°C (138°F)
10°C (50°F)	64°C (147°F)
24°C (75°F)	68°C (154°F)

**FASTENER TIGHTENING SPECIFICATIONS**

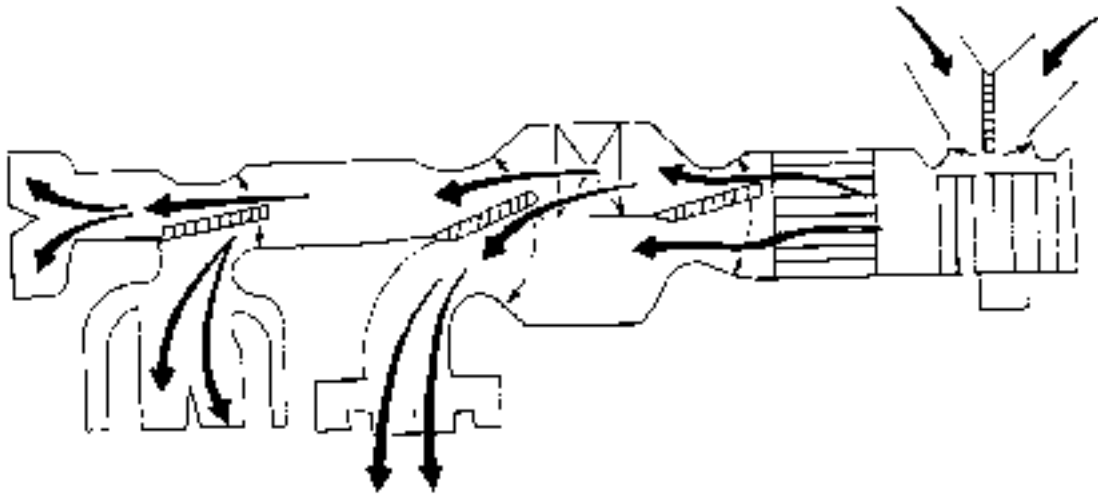
<b>Application</b>	<b>N·m</b>	<b>Lb-Ft</b>	<b>Lb-In</b>
Blower Motor-to-Heater/Air Distributor Case Screws	5	-	53
Blower Motor Resistor Screws	5	-	53
Controller Retaining Screws	4	-	35
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Heater Core Cover Screws			
Heater Core Retaining Bracket Screw			
Vacuum Tank Mounting Nuts	4	-	35

## SCHEMATIC AND ROUTING DIAGRAMS

## NON-A/C DIAGRAM



AIRFLOW - TYPICAL

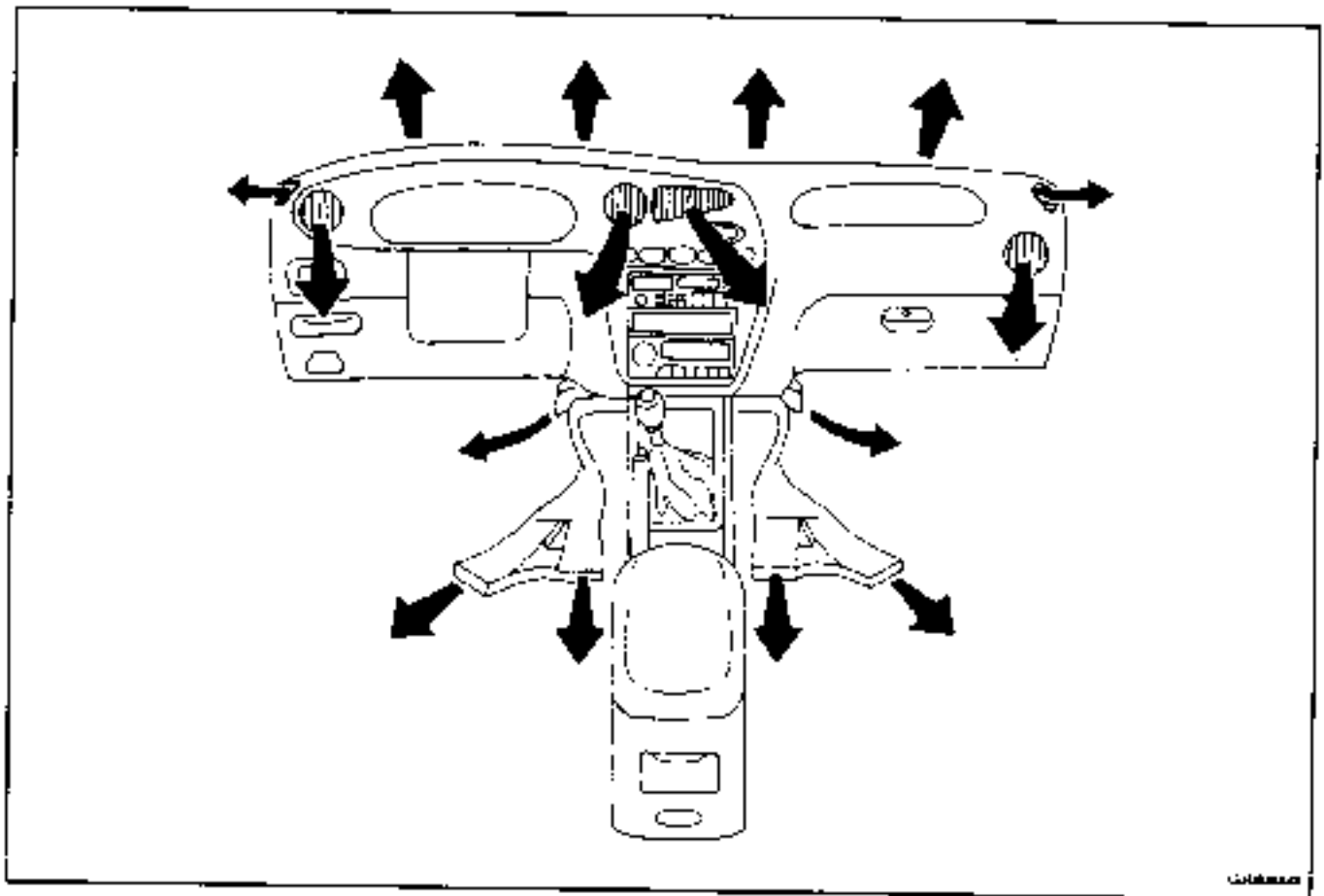


BT-100-010



### AIRFLOW WITH REAR HEATING DUCT

(Left-Hand Drive Shown, Right-Hand Drive Similar)



Continental

## DIAGNOSIS

## HEATER SYSTEM

## INSUFFICIENT HEATING OR DEFROSTING

**Caution:** The cooling system is pressurized when hot. Injury can result from removing the surge tank cap before the engine is sufficiently cool.

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Check the coolant level. Is the coolant level correct?	-	Go to Step 4	Go to Step 3
3	Add coolant as needed. Is the repair complete?	-	System OK	Go to Step 4
4	Check the drive belts for tension or damage. Are the drive belts OK?	-	Go to Step 6	Go to Step 5
5	Correct any problem with the drive belts. Is the repair complete?	-	System OK	Go to Step 6
6	Check the coolant hoses for leaks or kinks. Are the coolant hoses OK?	-	Go to Step 8	Go to Step 7
7	Repair any problem with the coolant hoses. Is the repair complete?	-	System OK	Go to Step 8
8	Check the surge tank cap. Refer to Section 10, Engine Cooling. Is the surge tank cap OK?	-	Go to Step 10	Go to Step 9
9	Repair or replace the surge tank cap as needed. Is the repair complete?	-	System OK	Go to Step 10
10	1. Turn the A/C switch OFF on vehicles equipped with air conditioning (A/C). 2. Set the blower motor switch on maximum speed. 3. Set the heater control to full hot. 4. Turn the ignition ON. 5. Check for airflow from the vent outlet. Is there heavy airflow from the vent outlet?	-	Go to Step 11	Go to Step 26
11	Check for a change in the airflow at various blower speeds. Does the blower speed increase as the switch is turned from minimum to maximum?	-	Go to Step 12	Go to "Blower Electrical (Manual and Non-A/C)"
12	1. Turn the A/C switch OFF. 2. Set the temperature lever to full hot. 3. Set the blower motor switch on maximum speed. 4. With the engine sufficiently cool, remove the surge tank cap. 5. Start the vehicle and idle the engine. 6. Watch for the flow of the coolant. Is the coolant flow visible?	-	Go to Step 14	Go to Step 13

## Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
13	1. Check the system for the following problems: <ul style="list-style-type: none"> <li>• Restriction in the cooling system.</li> <li>• Failed water pump impeller.</li> <li>• Faulty thermostat.</li> </ul> 2. Make repairs to the cooling system, as needed. Are the repairs complete?	-	System OK	Go to Step 14
14	1. Install the surge tank cap. 2. With the ignition ON, allow the engine to warm up for about 20 minutes. Drive the vehicle at 48 km/h (30 mph). 3. Use a thermometer to measure the ambient air temperature and the discharge air temperature at the heater outlet. Does the heater output meet the minimum values given?	Refer to "Heater Temperature Specifications"	Go to Step 15	Go to Step 16
15	1. Check the vehicle for cold air leaks at the following locations: <ul style="list-style-type: none"> <li>• Dash.</li> <li>• Heater cases</li> <li>• Vents.</li> </ul> 2. Check under the seat for obstructions. 3. Repair any leaks or obstructions. Are the repairs complete?	-	System OK	-
16	1. Turn the ignition OFF. 2. Turn the temperature control knob to full cold, then rapidly to full hot. 3. Listen for the sound of the temperature door slam just before reaching the end of the travel range of the control knob. Does the door slam?	-	Go to Step 18	Go to Step 17
17	1. Check the following aspects of the temperature door: <ul style="list-style-type: none"> <li>• Travel.</li> <li>• Cables.</li> <li>• Linkage.</li> </ul> 2. Verify the accuracy of the temperature controls at full hot. 3. Verify the accuracy of the temperature controls at full cold. Is the repair complete?	-	System OK	-
18	1. Set the temperature control knob to full hot. 2. Start the vehicle. 3. Check the temperature of the heater inlet hose and the heater outlet hose by feel. The air temperature around the hoses should be at least 29°C (84°F). Is the heater inlet hose hot and the heater outlet hose warm?	-	Go to Step 19	Go to Step 22
19	Check the thermostat. Refer to Section 10, Engine Cooling. Is the thermostat installed and seated properly?	-	Go to Step 20	Go to Step 21

## 7A-B HEATING AND VENTILATION SYSTEM

## Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
20	Replace the thermostat. Refer to Section 1D, Engine Cooling. Is the repair complete?	-	System OK	-
21	Reinstall the thermostat. Is the repair complete?	-	System OK	-
22	Inspect the heater hoses for proper installation. Are the heater hoses reversed?	-	Go to Step 23	Go to Step 24
23	Reinstall the heater hoses properly. Is the repair complete?	-	System OK	-
24	1. Back flush the heater core. 2. Drain the cooling system. 3. Replace the coolant. 4. Warm the engine to an average operating temperature. 5. Feel the heater inlet hose and the heater outlet hose. Is the heater inlet hose hot and the heater outlet hose warm?	-	System OK	Go to Step 25
25	Replace the heater core. Is the repair complete?	-	System OK	-
26	Recheck the system using the "Control Settings/Correct Results" tests. Refer to "Improper Air Delivery or No Mode Shift" in this section. Is the repair complete?	-	System OK	Go to Step 27
27	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or the vent outlets?	-	Go to Step 28	Go to Step 29
28	1. Check the heater door at the floor and the vent door to get the proper airflow and to verify proper operation. 2. Repair as required. Is the repair complete?	-	System OK	-
29	Switch the mode knob to defrost. Is the defroster airflow OK?	-	Go to Step 30	Go to Step 31
30	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions in the heater outlet. Is the repair complete?	-	System OK	-
31	Check for an airflow change at various blower speeds. Does the blower speed increase as the control is turned from minimum to maximum?	-	Go to Step 32	Go to "Blower Electrical (Manual and Non-A/C)"
32	Check for obstructions in the system at the blower inlet and at the air filter, if the vehicle is equipped with one. Are there any obstructions?	-	Go to Step 33	Go to Step 34
33	Remove the obstructions in the system at the blower inlet or replace a clogged filter. Is the repair complete?	-	System OK	-

## Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
34	1. Set the blower on maximum speed. 2. Rotate the temperature control from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?	-	Go to Step 35	Go to Step 36
35	1. Check the following aspects of the temperature door: • Travel. • Cables • Linkage. • Control. 2. Verify the accuracy of the temperature control at full hot. Is the repair complete?	-	Go to Step 1	-
36	1. Check the system for any obstruction between the blower and the system outlets. 2. Remove any obstruction. Is the repair complete?	-	Go to Step 1	-

## BLOWER ELECTRICAL (MANUAL AND NON-A/C)

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Turn the blower ON. Does the blower run at any speed?	-	Go to Step 14	Go to Step 3
3	1. Disconnect the power connector from the blower motor under the dashboard on the passenger side of the vehicle. 2. Turn the ignition ON. 3. Turn the blower ON. 4. Test for voltage on the connector. The terminal connected to the PPL wire is positive and the terminal connected to the BLK wire is negative. Is this voltage present?	11-14 v	Go to Step 4	Go to Step 5
4	Replace the blower motor. Is the repair complete?	-	System OK	-
5	Check fuse EF5 in the engine fuse block. Is the fuse blown?	-	Go to Step 6	Go to Step 7
6	1. Turn the ignition ON. 2. Use a short detector to locate a possible short in the following locations: • Fuse panel-to-blower speed switch. • Blower speed switch-to-heater resistor block. • Heater resistor block-to-blower motor. • Blower speed switch-to-blower H relay. 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?	-	System OK	-

## 7A-10 HEATING AND VENTILATION SYSTEM

## Blower Electrical (Manual and Non-A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
7	1. Turn the ignition ON. 2. Set the blower switch on 4. 3. Check the blower motor ground. Is the ground OK?	-	Go to Step 9	Go to Step 8
8	Repair the blower motor ground. Is the repair complete?	-	System OK	-
9	Check the motor connector with a 12-volt test light. Does the test light come on?	-	Go to Step 10	Go to Step 11
10	Repair the open in the feed wire from the resistor block to the blower motor. Is the repair complete?	-	System OK	-
11	Use the 12-volt test light to check the power feed terminal on the blower speed switch. Does the light come on?	-	Go to Step 12	Go to Step 13
12	Replace the blower speed switch. Is the repair complete?	-	System OK	-
13	Repair the open in the power wire from the blower speed switch to the fuse panel. Is the repair complete?	-	System OK	-
14	Turn the blower on speed 4. Does the blower fail to operate at speed 4?	-	Go to Step 15	Go to Step 21
15	Check fuse EF2 in the engine fuse block. Is this fuse blown?	-	Go to Step 16	Go to Step 17
16	1. Turn the ignition ON. 2. Set the blower motor switch on 4. 3. Use a short detector to locate a possible short in the following locations: • Engine fuse panel-to-blower HI relay. • Blower HI relay-to-blower motor. 4. Repair any short. 5. Replace the EF2 fuse. Is the repair complete?	-	System OK	-
17	1. Turn the ignition switch ON. 2. Set the blower switch on 4. 3. Check for 12 volts on the blower HI relay coil terminal from the blower speed switch terminal A2. Is this voltage present?	-	Go to Step 18	Go to Step 19
18	Replace the blower speed switch. Is the repair complete?	-	System OK	-
19	1. Turn the ignition OFF. 2. Check for opens in the following locations: • EF2 fuse-to-blower HI relay. • Blower speed switch-to-blower HI relay. • Blower HI relay-to-ground. • Blower HI relay-to-blower motor. 3. Repair any opens. Is the repair complete?	-	System OK	Go to Step 20

## Blower Electrical (Manual and Non-A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
20	Replace the blower HI relay. Is the repair complete?	-	System OK	-
21	1. Disconnect the resistor block connector. 2. Connect one lead of a self-powered test light to any single lead on the resistor block. Use the other lead to probe each of the other two terminals. Does the test light illuminate on all terminals?	-	Go to Step 23	Go to Step 22
22	Replace the resistor block. Is the repair complete?	-	System OK	-
23	1. Turn the ignition to LOCK. 2. Disconnect the connector from the resistor block. 3. Connect a jumper lead from the positive terminal on the battery to any wire terminal in the connector. 4. Use a 12-volt test light to check for voltage from the corresponding wire on the blower speed switch. 5. Repeat the same test on the other wires. Does the lamp light on all three wires?	-	Go to Step 25	Go to Step 24
24	Replace the blower speed switch. Is the repair complete?	-	System OK	-
25	Repair the open in the affected wire. Is the repair complete?	-	System OK	-

## IMPROPER AIR DELIVERY OR NO MODE SHIFT (MANUAL AND NON-A/C)

This procedure provides a test of all functions of the heater/defroster unit.

1. Warm up the vehicle.
2. Keep the engine running.
3. Perform the tests outlined in the table below and look for the results indicated.

CONTROL SETTINGS			CORRECT RESULTS				
MODE KNOB	TEMP. CONTROL	BLOWER MOTOR SWITCH	BLOWER SPEED	POWER VENT OUTLET	FLOOR OUTLET	DEFROST OUTLET	SIDE WINDOW OUTLET
Vent	Cold	Off	Off	No Airflow	No Airflow	No Airflow	No Airflow
Vent	Cold	4	High	Ambient Airflow	No Airflow	No Airflow	No Airflow
Floor	Cold to Hot	4	High	No Airflow	Cold to Hot Airflow	Minimum Cold to Hot Airflow	Minimum Cold to Hot Airflow
Defroster	Cold to Hot	4	High	No Airflow	Minimum Cold to Hot Airflow	Cold to Hot Airflow	Minimum Cold to Hot Airflow

If any of these settings does not produce the correct results, perform the following diagnostic procedure.

## 7A - 12 HEATING AND VENTILATION SYSTEM

## Improper Air Delivery or No Mode Shift (Manual and Non-A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint Are the customer's concerns verified?	-	Go to Step 2	System OK
2	1. Examine the affected door in the unit for proper attachment to the vacuum actuator. 2. Check the actuator connection to the door. 3. Check that the vacuum hose is properly connected. Is everything connected properly?	-	Go to Step 4	Go to Step 3
3	Repair as necessary. Is the repair complete?	-	System OK	-
4	1. Disconnect the actuator at the door 2. Check the range of the door travel and the effort required to move it Does the door move freely through its entire range of travel so that it can close at both ends of the range?	-	Go to Step 5	Go to Step 3
5	Check the travel of the actuator by turning the control knob with the engine running Is the actuator travel OK?	-	Go to Step 6	Go to Step 7
6	1. Reinstall the actuator. 2. Recheck the system using the "Control Settings/Correct Results" tests in this procedure. Does the system perform properly?	-	System OK	Go to Step 9
7	1. Check the vacuum hose at the control 2. Check for a broken control. Is there a problem with the vacuum hose or the control?	-	Go to Step 8	Go to Step 9
8	Repair the vacuum hose or the control as necessary. Is the repair complete?	-	System OK	Go to Step 9
9	Recheck the system using the "Control Settings/Correct Results" tests in this procedure. Is the repair complete?	-	System OK	Go to Step 10
10	Check for airflow from the defroster or the vent outlets Is there high airflow from the defroster or the vent outlets?	-	Go to Step 11	Go to Step 12
11	Adjust the heater door at the floor and the vent door to get the proper airflow Is the repair complete?	-	System OK	-
12	Switch the mode knob to defrost. Is the defroster airflow OK?	-	Go to Step 13	Go to Step 14
13	1. Remove the heater outlet. 2. Check the heater outlet for obstructions. 3. Remove any obstructions in the heater outlet. Is the repair complete?	-	System OK	-
14	Check the blower speeds for change in the airflow. Does the blower speed increase as the control is turned from 1 to 4?	-	Go to Step 15	Go to "Blower Electrical (Manual and Non-A/C)"



## Improper Air Delivery or No Mode Shift (Manual and Non-A/C) (Cont'd)

Step	Action	Value(s)	Yes	No
15	1. Check for obstructions in the system at the blower inlet and check the air filter if the vehicle is so equipped. 2. Remove any obstructions at the blower inlet and replace the filter if it is clogged. Is the repair complete?	-	System OK	Go to Step 16
16	1. Set the blower on 4. 2. Rotate the temperature control from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?	-	Go to Step 17	Go to Step 18
17	1. Check the temperature door, the cable, the linkage, and the control. 2. Adjust the temperature control to full hot. Is the repair complete?	-	System OK	-
18	1. Check the system for any obstruction between the blower and the system outlets. 2. Remove any obstruction between the blower and the system outlets. Is the repair complete?	-	System OK	-

## TOO MUCH HEAT

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Is there too much heat when the mode switch is in the floor position?	-	Go to Step 3	Go to Step 9
3	Is there objectionable defroster bleed?	-	Go to Step 4	Go to Step 5
4	1. Check the door travel, the cable, the vacuum actuators, and the linkage for the heater and the defroster. 2. Adjust or repair, as required. Is the repair complete?	-	System OK	-
5	1. In vehicles equipped with A/C, set the A/C switch OFF. 2. In all vehicles, set the blower speed to maximum. 3. Set the temperature to full hot. 4. Turn the ignition switch ON. 5. Start the engine. 6. Check for airflow from the floor outlets. 7. Check the floor outlet attachment. Is the airflow high?	-	Go to Step 6	Go to Step 8
6	Check for a change in the airflow at different blower speeds. Does the airflow change as the setting for the blower-speed switch is changed?	-	Go to Step 7	Go to "Blower Electrical (Manual and Non-A/C)"

7A - 14 HEATING AND VENTILATION SYSTEM

Too Much Heat (Cont'd)

Step	Action	Value(s)	Yes	No
7	1. Check the temperature door travel, the cable, and the linkage. 2. Adjust to full cold. 3. Check for full hot. Is the repair complete?	-	System OK	-
8	Adjust or repair the floor/defroster and/or the vent/floor mode. Is the repair complete?	-	System OK	-
9	In the vent position, is the problem objectionable bleed?	-	Go to Step 10	Go to Step 15
10	1. Check the system case for leaks. 2. Check the floor outlet attachment. Are there problems?	-	Go to Step 11	Go to Step 12
11	Repair the system case or the floor outlet attachment as required. Is the repair complete?	-	System OK	Go to Step 12
12	1. Turn the ignition switch OFF. 2. Turn the temperature control knob to full hot, then rapidly to full cold. Do you hear the door slam just before you reach the end of the control travel?	-	Go to Step 13	Go to Step 14
13	Adjust the vent door to vent more. Is the repair complete?	-	System OK	-
14	1. Check the temperature door travel, the cable, and the linkage. 2. Verify that the temperature door goes to full cold. 3. Check the temperature door for full hot. Is the temperature door travel correct?	-	System OK	-
15	1. Set the fresh air/recirculating air control to fresh air (indicator lamp off). 2. Set the temperature control to full cold. 3. Start the vehicle and allow the engine to warm up. 4. Measure the air temperature at the blower inlet, or cowl, and at the vent air outlet inside the vehicle. Is the outlet air more than 5°C (41°F) warmer than the inlet air?	-	Go to Step 16	System OK
16	1. Check for hot air leaks from the engine compartment to the blower inlet. 2. Repair as needed. Is the repair complete?	-	System OK	-

## CONTROLS

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Move controls other than the temperature adjustment. Is an excessive effort required to move the controls?	-	Go to Step 15	Go to Step 3
3	Move the temperature control. Is an excessive effort required to move the control?	-	Go to Step 6	Go to Step 4
4	Move the blower control to maximum. Does the temperature door move too easily?	-	Go to Step 5	System OK
5	Remove the cable from the controller. Does the control knob turn freely, without the click stops?	-	Go to Step 15	-
6	Check the cables for improper routing, kinks, wiring interference, or other instrument panel interference. Is there a problem?	-	Go to Step 7	Go to Step 8
7	Repair as needed. Is the repair complete?	-	System OK	-
8	1. Remove the cable from the temperature door. 2. Cycle the door manually. 3. Check for door binding. Is there any door binding?	-	Go to Step 9	Go to Step 12
9	Check the door seal for proper installation. Is the door seal OK?	-	Go to Step 10	Go to Step 11
10	1. Check a binding door for shaft alignment, a bent shaft, a bent door, or a warped case. 2. Repair as needed. Is the repair complete?	-	System OK	-
11	Repair the door seal as needed. Is the repair complete?	-	System OK	-
12	Check for control binding. Does the control bind?	-	Go to Step 14	Go to Step 13
13	1. Reinstall the cable to the door. 2. Check the clearance for the cable-to-dash components. 3. Repair any interference. Is the repair complete?	-	System OK	-
14	1. Remove the cable from the control. 2. Check the control for binding. Does the control bind?	-	Go to Step 15	Go to Step 16
15	Replace the control. Is the repair complete?	-	System OK	-
16	Replace the cable. Is the repair complete?	-	System OK	-

## BLOWER NOISE

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	1. Sit inside the vehicle. 2. Close the doors and the windows. 3. Turn the Ignition ON. 4. Start the engine. 5. Set the temperature to full cold. 6. Cycle through the blower speeds, the modes, and the temperature settings in order to find the noise. Is the blower noise constant at high blower speeds or certain modes, but absent at lower speeds or in other modes?	-	Go to Step 11	Go to Step 3
3	Check for vibrations from the blower motor and fan assembly at each blower speed by feeling the blower motor housing. Do you find excessive vibration?	-	Go to Step 5	Go to Step 4
4	1. Remove the blower motor and fan assembly. Refer to "Blower Motor" in this section. 2. Check for foreign material at the opening of the blower inlet. Do you find any foreign material at the blower inlet?	-	Go to Step 5	Go to Step 6
5	Remove all foreign material. Is the repair complete?	-	System OK	Go to Step 6
6	1. Examine the blower fan for wear spots, cracked blades, a cracked hub, a loose fan retaining nut, or bad alignment. 2. Examine the blower case for wear spots. Do you find any problem?	-	Go to Step 7	Go to Step 9
7	Repair as required. Is the repair complete?	-	System OK	Go to Step 8
8	Replace the motor and fan assembly. Is the repair complete?	-	System OK	Go to Step 9
9	If the noise is a click/tick or whine, replace the motor. Is the repair complete?	-	System OK	Go to Step 10
10	Reinstall the original motor. Is the problem still present?	-	Go to Step 11	System OK
11	1. Set the blower speed on maximum. 2. Check full-hot to full-cold temperature positions in the defrost, floor, and vent modes. Is the noise present in the defrost mode only?	-	Go to Step 12	Go to Step 13
12	1. Check the ducts for obstructions or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check the floor/defroster door seals. 4. Repair or replace the door seals, as needed. Is the repair complete?	-	System OK	-
13	Is the noise present in the floor mode only?	-	Go to Step 12	Go to Step 14

## Blower Noise (Cont'd)

Step	Action	Value(s)	Yes	No
14	Is the noise present in the vent mode only?	-	Go to Step 15	Go to Step 16
15	1. Check the ducts for obstructions or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check the vent door seals. 4. Repair or replace as needed. Is the repair complete?	-	System OK	-
16	Is the noise present in all modes but not all temperature positions?	-	Go to Step 17	Go to Step 18
17	1. Check the temperature door seals. 2. Repair or replace, as needed. Is the repair complete?	-	System OK	-
18	1. Check the system for obstructions or foreign materials between the fan and the temperature door. 2. Repair or replace, as needed. Is the repair complete?	-	System OK	Go to Step 2

**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****TEMPERATURE CABLE  
ADJUSTMENT**

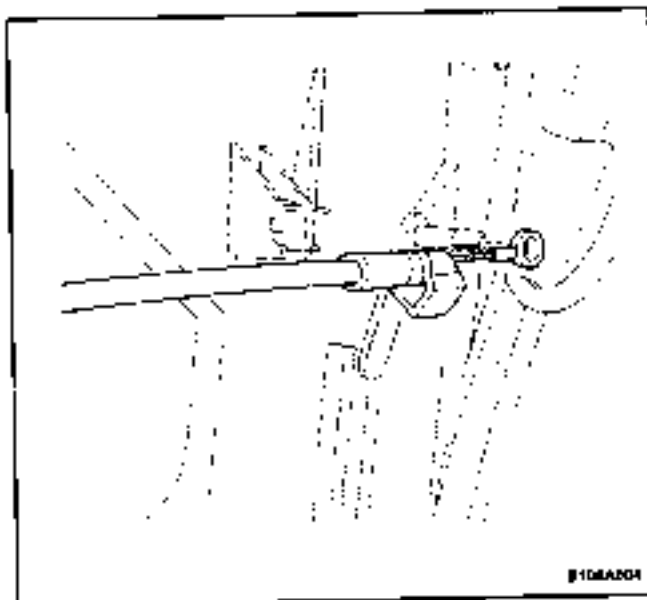
Because the cable and the cable housings have fixed lengths, it is impossible to make a temperature cable adjustment.

The heater/air distributor case linkage also cannot be adjusted.

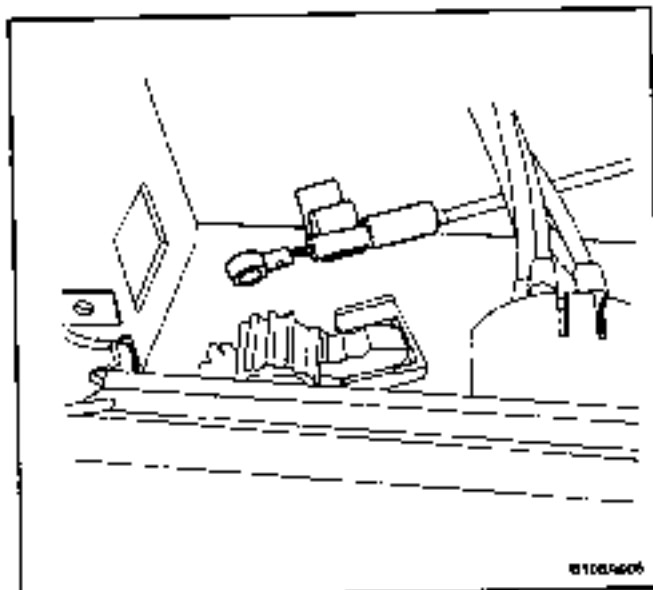
If a malfunction is suspected, verify the proper operation of the controller and the mechanical doors for the heater/air distributor case assembly.

**TEMPERATURE CONTROL CABLE  
(Left-Hand Drive Shown, Right-Hand  
Drive Similar)****Removal Procedure**

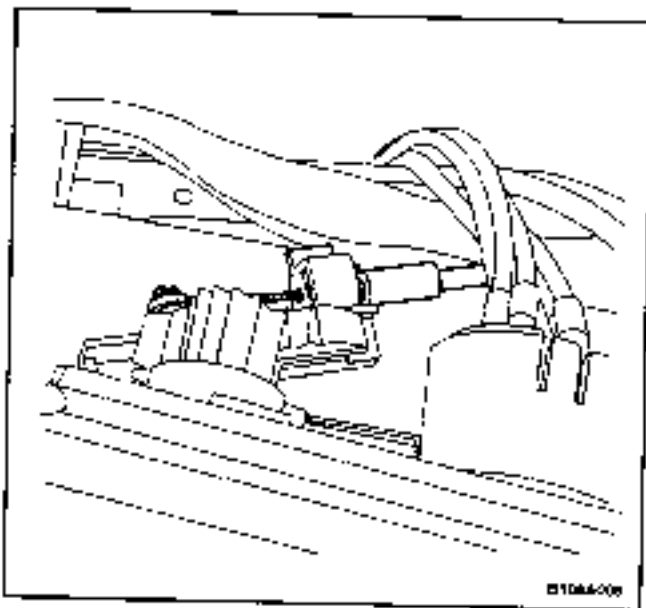
1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Slide the cable eyelet off the post on the temperature door lever.
4. Disconnect the cable retainer from the blower housing.
5. Remove the audio system trim plate. Refer to *Section 9F, Audio Systems*.
6. Remove the four controller retaining screws.
7. Pull out the controller to provide clearance for removal of the temperature control cable.
8. Disconnect the temperature control cable eyelet from the post on the controller.
9. Snap the cable housing connector out of the slide position on the controller.



9106A204

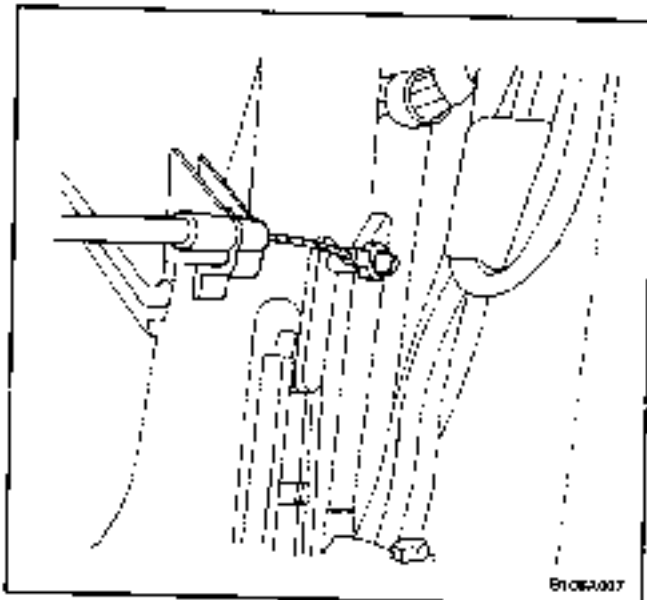


9106A205



### Installation Procedure

1. Install the temperature control cable eyelet to the post on the controller.
2. Snap the cable housing connector to the slice position on the controller.

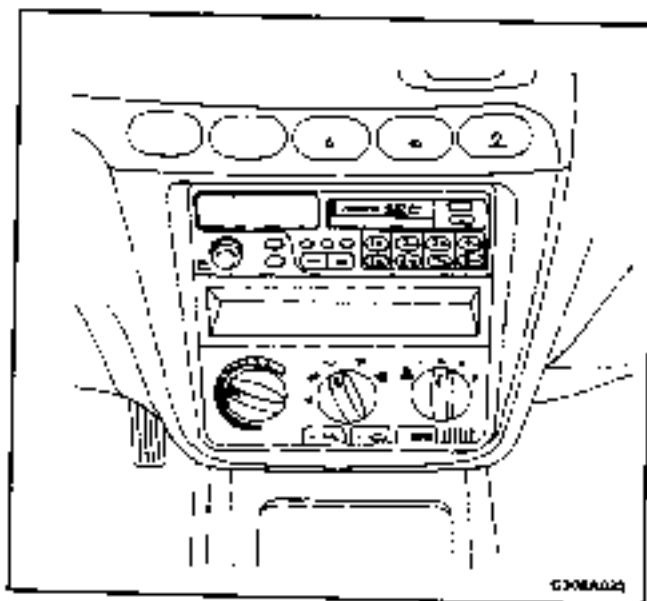


3. Gently insert the controller into position on the center console.
4. Install the four controller retaining screws.

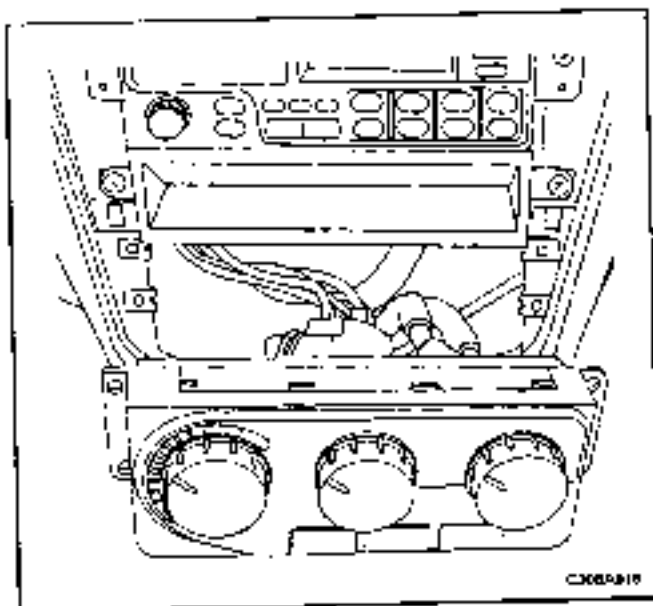
### Tighten

Tighten the controller retaining screws to 4 N•m (25 lb-in).

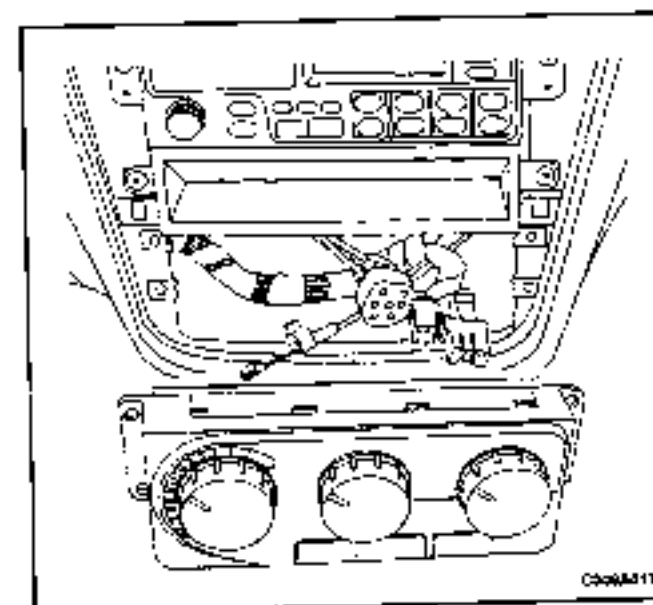
5. Install the temperature control cable eyelet to the post on the temperature door lever.
6. Snap the cable retainer to the blower housing.



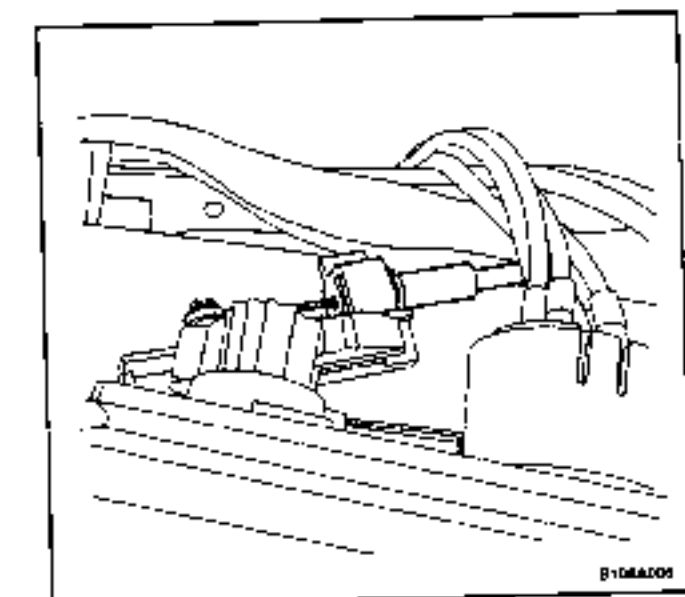
7. Move the temperature control to verify the smooth operation and function of the door and the cable.
8. Install the audio system trim plate. Refer to Section 9F, *Audio Systems*.
9. Connect the negative battery cable.
10. Operate the heating and cooling systems to verify proper function.
11. Install the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.



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## CONTROL ASSEMBLY

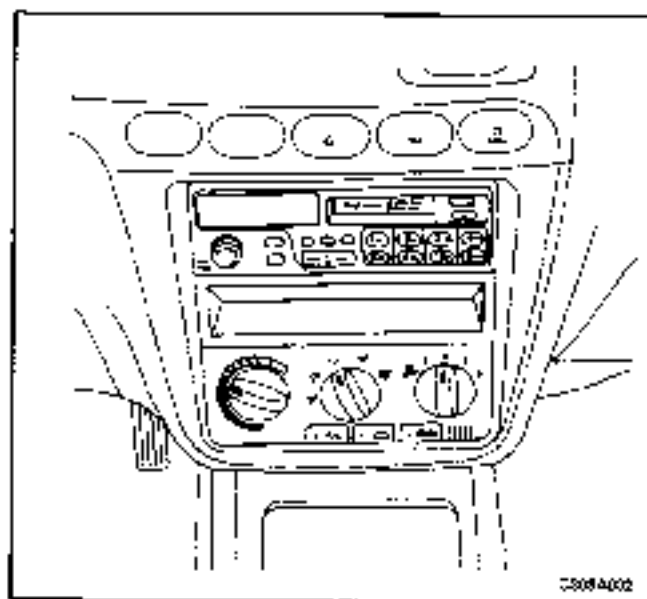
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the audio system trim plate. Refer to Section 9F, *Audio Systems*.
3. Remove the four controller retaining screws.
4. Pull out the controller to provide clearance for removal of the temperature control cable.
5. Disconnect the temperature control cable by gently prying the cable eyelet from the post on the controller. Unsnap the cable housing from the mechanical slide. Note the location of the cable and the housing for ease of installation.
6. Disconnect the electrical connectors.
7. Remove the vacuum hose connection block from the mode control switch.

### Installation Procedure

1. Connect the vacuum hose connection block to the mode control switch.
2. Press the cable end eyelet onto the post on the controller.
3. Attach the mechanical cable housing to its original control position.
4. Connect the electrical connectors to the sockets on the back of the controller.

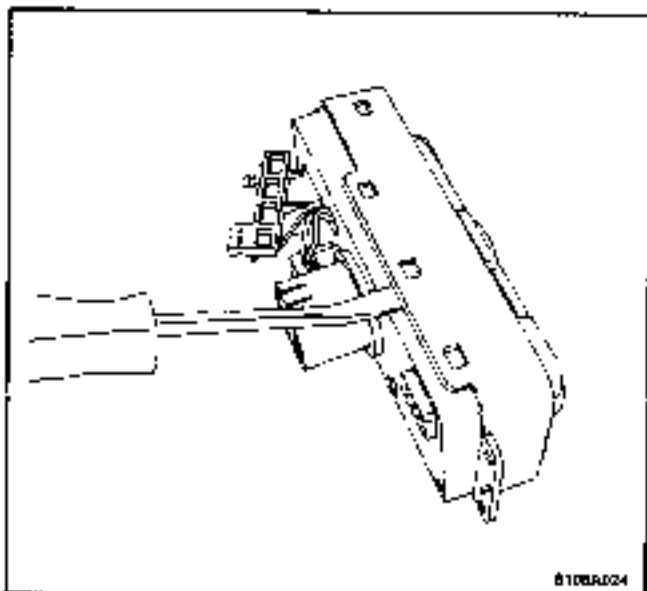




5. Gently insert the controller into position on the center console.
6. Install the retaining screws.

#### **Tighten**

- Tighten the controller retaining screws to 4 N•m (35 lb•ft).
7. Connect the negative battery cable.
  8. Confirm the proper operation of the controller by moving it through all of the controller's possible functioning positions.
  9. Install the audio system trim plate. Refer to Section 9F, Audio Systems.

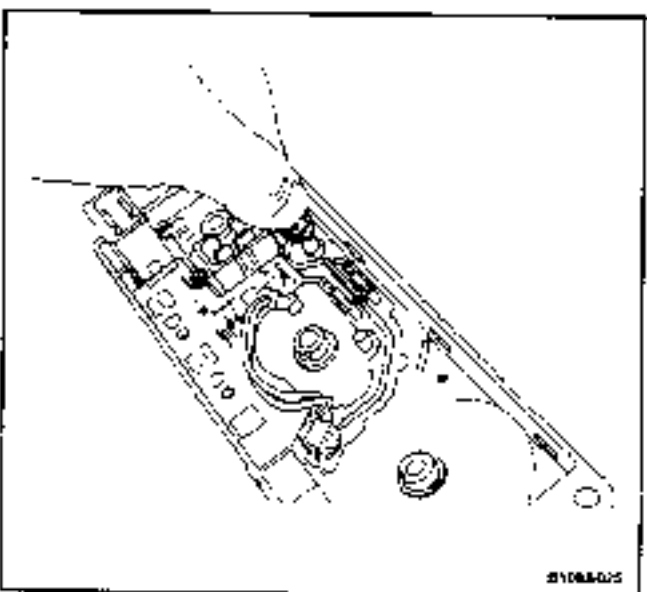


### **CONTROL ASSEMBLY KNOB LIGHTING**

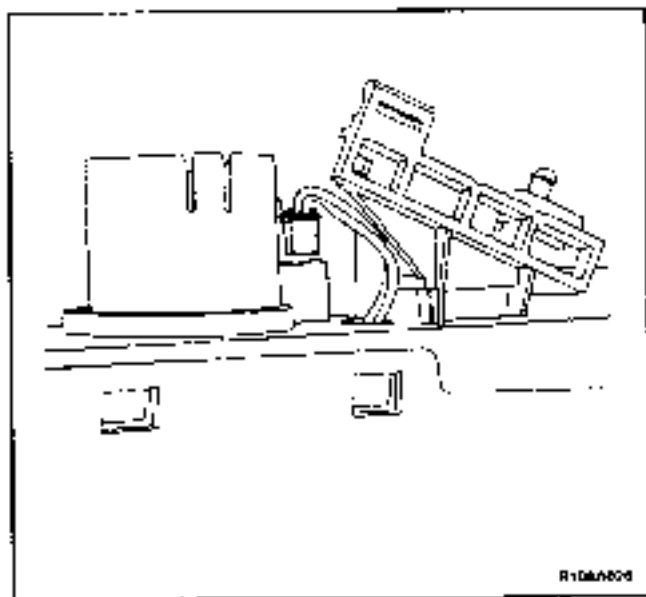
**(Left-Hand Drive Shown, Right-Hand Drive Similar)**

#### **Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the heating and ventilation system control assembly. Refer to "Control Assembly" in this section.
3. Disconnect the small connector to the vacuum control switch on the rear of the assembly case.
4. Separate the control assembly case halves.

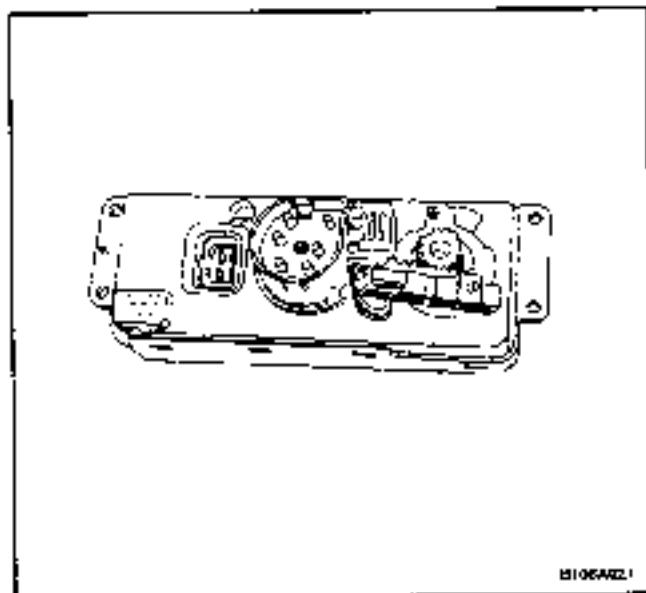


5. Turn the bulb holder to the left and pull out the bulb.

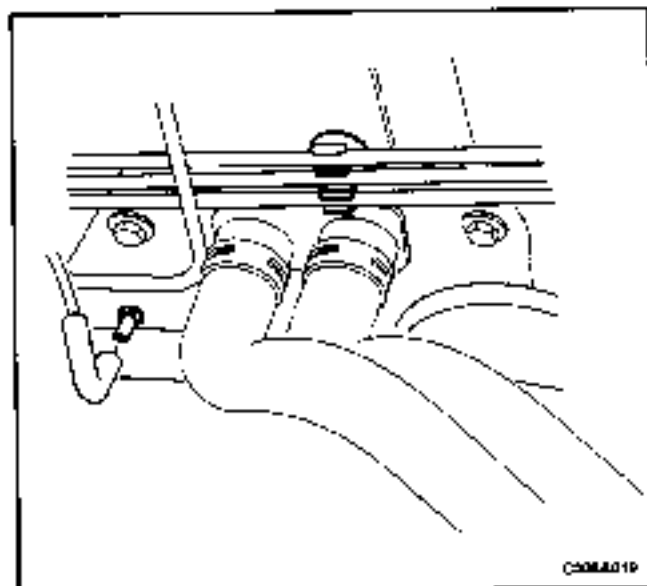


### Installation Procedure

1. Install the bulb into the holder and turn the bulb to the right.
2. Install the control assembly case halves.
  - Pass the connector for the vacuum switch through the hole in the rear assembly case part.
  - Be sure to align the flats on mating control shafts of the two case halves.
3. Install the connector into the vacuum control switch.



4. Install the control assembly. Refer to 'Control Assembly' in this section.
5. Connect the negative battery cable.
6. Check the knob light for proper operation.

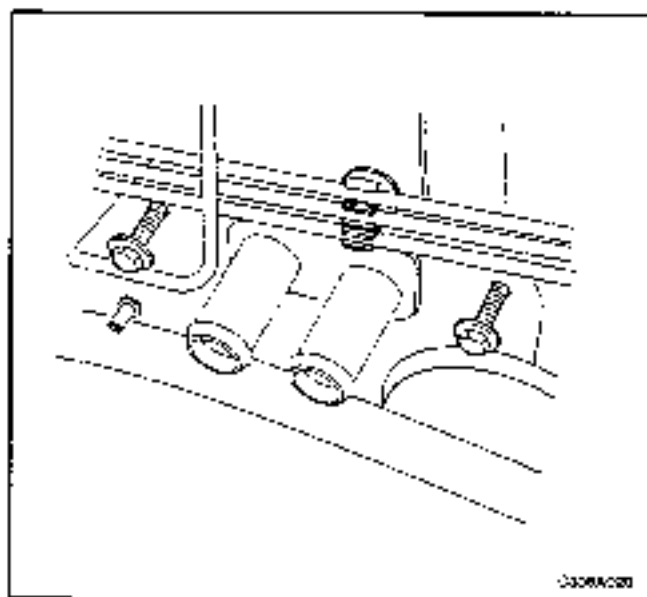


### HEATER/AIR DISTRIBUTOR CASE ASSEMBLY

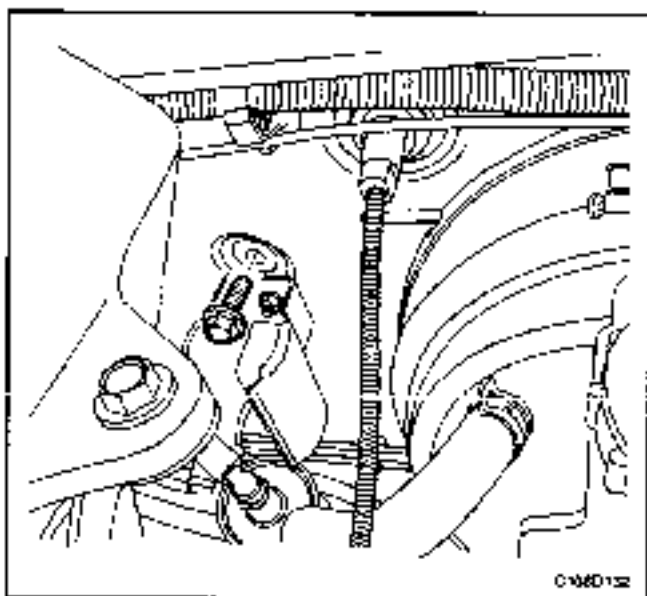
(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

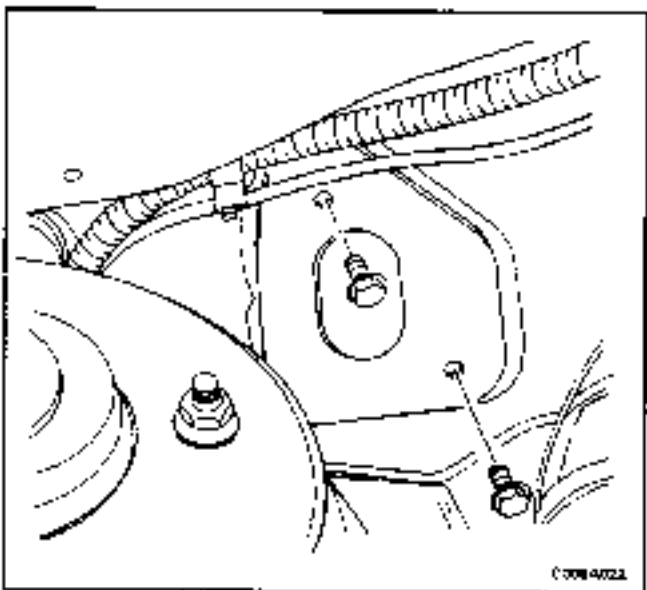
1. Disconnect the negative battery cable.
2. Remove the instrument panel corner assembly. Refer to Section 3E, Instrumentation/Driver Information.
3. Drain the cooling system. Refer to Section 1D, Engine Cooling.
4. Twist the vacuum hose connection and remove it from beside the heater hoses.



5. Compress the heater hose clamps at the fire wall and slide the clamps toward the engine.
6. Remove the two heater hoses from the core pipes at the fire wall.
7. Remove the screws that secure the heater/air distributor case assembly to the fire wall on either side of the heater hoses.



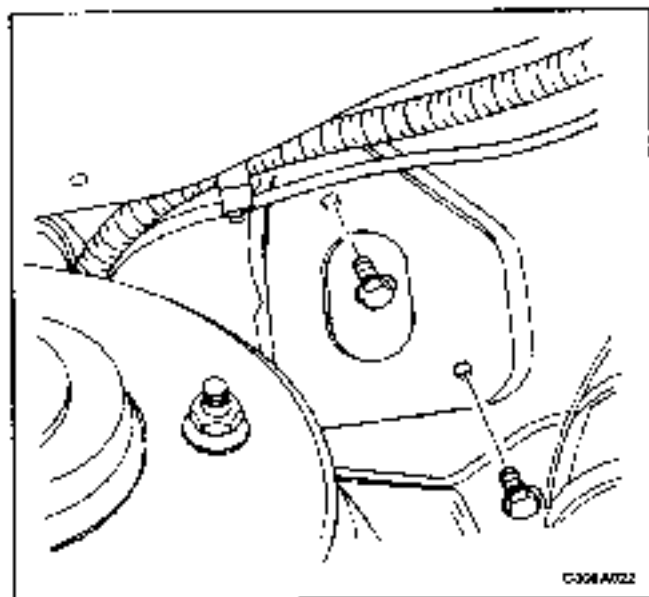
8. Remove the heater/air distributor case screw from above the fuel filler on the engine compartment side of the fire wall.



9. Have an assistant support the heater/air distributor case from inside the vehicle.
10. Remove the heater/air distributor case screws from the connecting block mount on the engine compartment side of the fire wall. The heater/air distributor case assembly will start to drop.

**Notice:** To avoid damaging the heater core pipes, move the heater/air distributor case assembly straight away from the vehicle until the pipes are free from their openings in the fire wall.

11. Remove the heater/air distributor case assembly.



### Installation Procedure

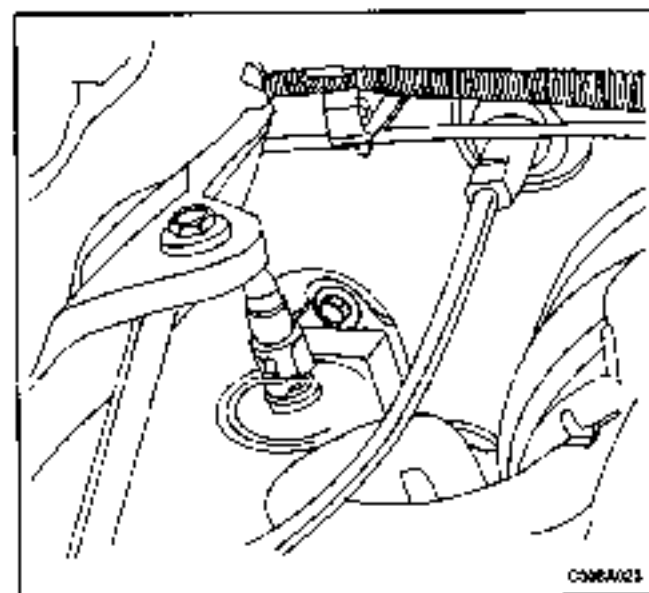
1. Position the heater/air distributor case assembly in the vehicle.

**Notice:** To avoid damaging the vehicle, make sure the heater core pipes do not contact the fire wall opening.

2. Slowly raise the heater/air distributor case assembly into position against the fire wall and hold it there while the screws are installed and tightened from the engine side of the fire wall.
3. Install the heater/air distributor case assembly screws at the connecting block mount on the engine compartment side of the fire wall.

### Tighten

Tighten the heater/air distributor case assembly screws to 8 N•m (71 lb-in).

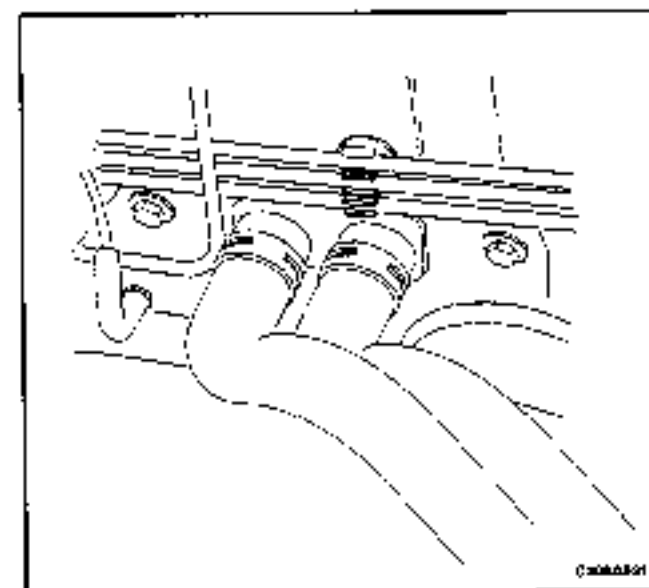


4. Align and install the heater/air distributor case assembly screw above the fuel filter.

### Tighten

Tighten the heater/air distributor case assembly screw to 8 N•m (71 lb-in).

5. Replace the fuel filter into its mounting clamp.

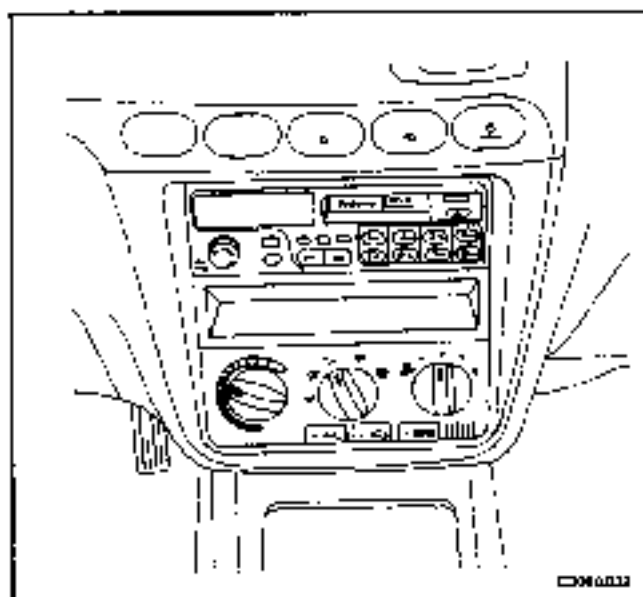


6. Install the heater/air distributor case assembly screws on either side of the heater core pipes.

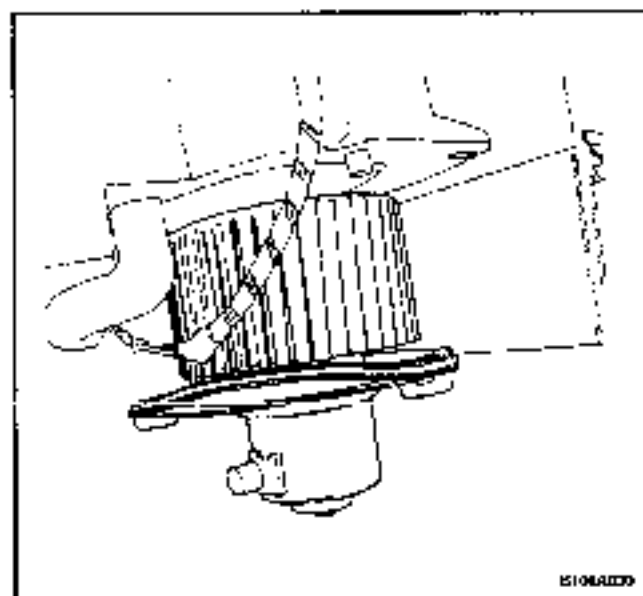
### Tighten

Tighten the heater/air distributor case assembly screws to 8 N•m (71 lb-in).

7. Install the two heater hoses.
8. Slide the heater hose clamps into position.
9. Install the vacuum hose.



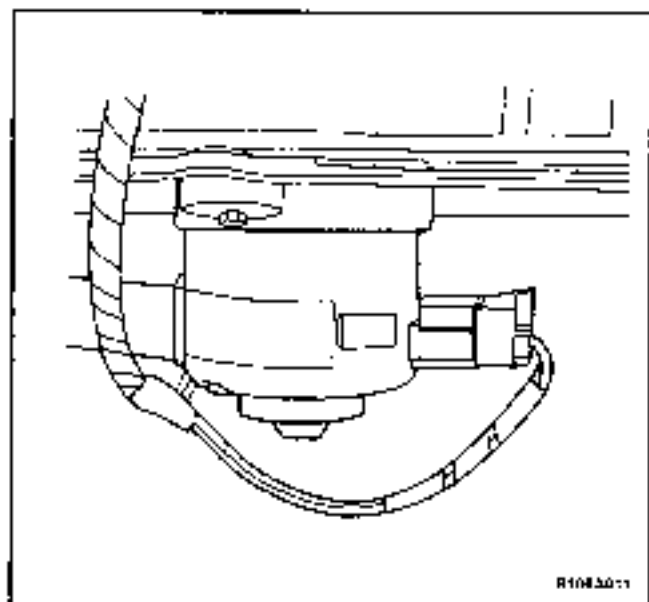
10. Install the instrument panel carrier assembly. Refer to Section 9E, *Instrumentation/Driver Information*.
11. Fill the cooling system. Refer to Section 10, *Engine Cooling*.
12. Connect the negative battery cable.
13. Operate the controls to verify that the heating and ventilator systems function properly.



## BLOWER MOTOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Remove the footwell upper cover. Refer to Section 9E, *Instrumentation/Driver Information*.
4. Disconnect the blower motor electrical connector.
5. Remove the blower motor cooling hose.
6. Remove the screws that secure the motor to the heater/air distributor case.
7. Remove the motor, the seal, and the shock mount pads from the heater/air distributor case by gently pulling the motor straight down and out.



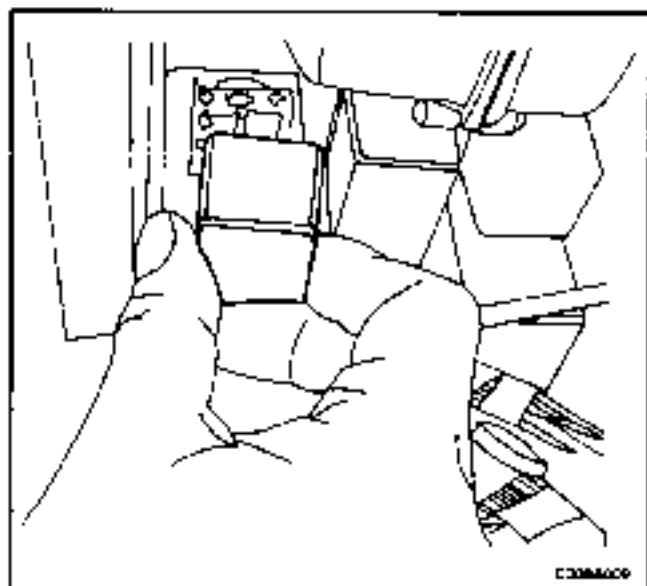
### Installation Procedure

1. Install the blower motor and the seal with the shuck mount pads in the heater/air distributor case. Hold the blower motor in position.
2. Install the screws to secure the blower motor to the heater/air distributor case.

### Tighten

Tighten the blower motor-to-heater/air distributor case screws to 6 N·m (53 lb-in).

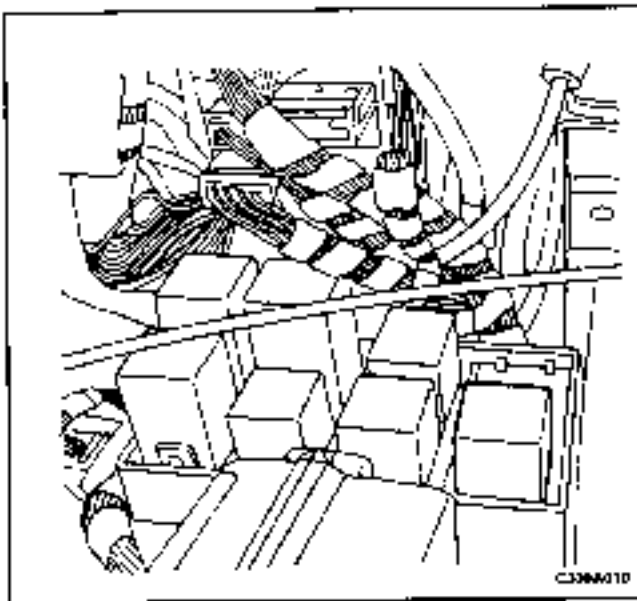
3. Install the blower motor cooling hose.
4. Connect the blower motor electrical connector.
5. Connect the negative battery cable.
6. Confirm that the blower motor operates properly.
7. Replace the footwell upper cover. Refer to Section 9E, *Instrumentation/Driver Information*.
8. Replace the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.



## HIGH-BLOWER RELAY

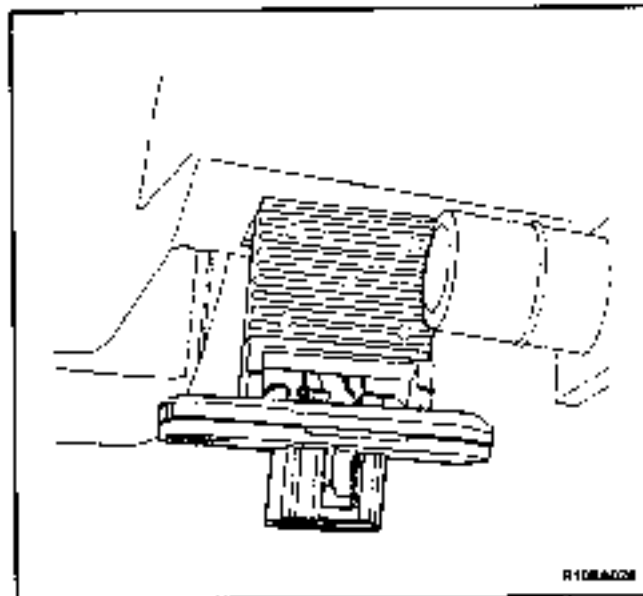
### Removal Procedure

1. Disconnect the negative battery cable.
2. Locate the relay box under the instrument panel on the left side.
3. Pull out the high-blower relay at the front of the relay box.



### Installation Procedure

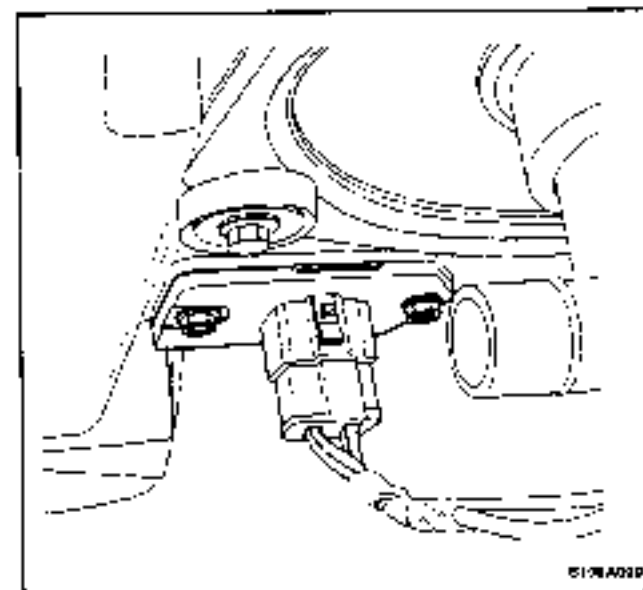
1. Align the high-blower relay contacts with the relay terminal slots.
2. Push the relay firmly into base. The relay must be seated and flush with the base edge.
3. Connect the negative battery cable.



### BLOWER RESISTOR

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Remove the footwell upper cover. Refer to Section 9E, *Instrumentation/Driver Information*.
4. Disconnect the electrical connector at the resistor.
5. Remove the mount screws from the resistor.
6. Remove the resistor from the heater/air distributor case by gently jolting the resistor downward.



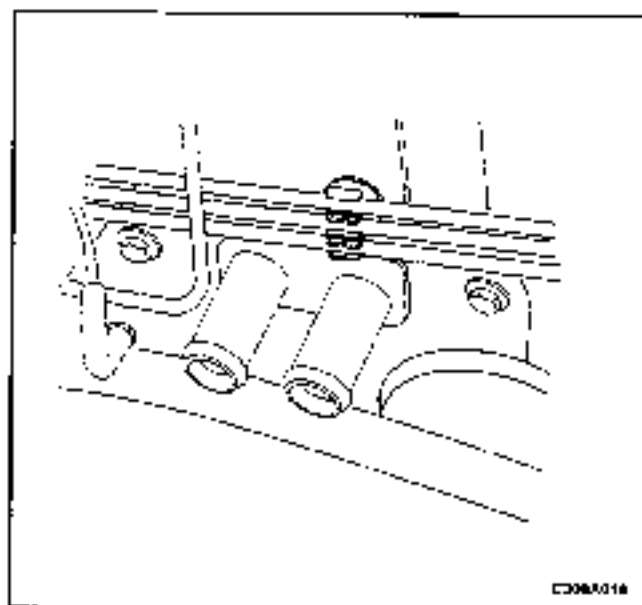
#### Installation Procedure

1. Install the new resistor into the heater/air distributor case with the screws.

#### Tighten

Tighten the blower motor resistor screws to 6 N·m (53 lb·ft).

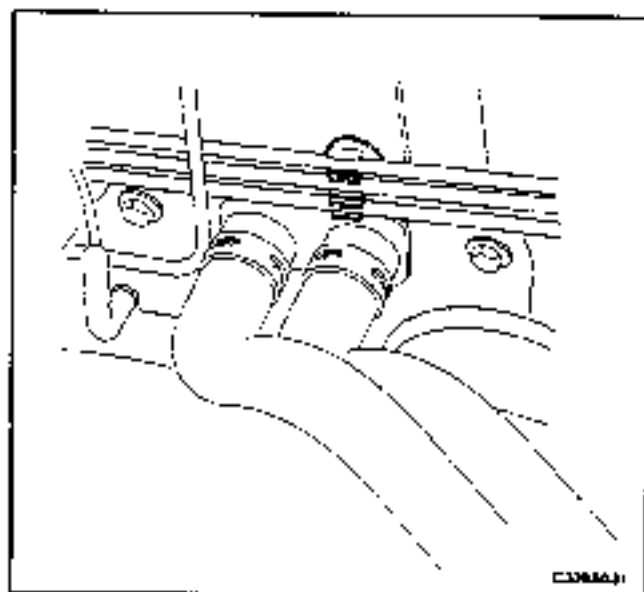
2. Connect the electrical connector of the resistor.
3. Connect the negative battery cable.
4. Confirm the proper performance of the blower.
5. Replace the footwell upper cover. Refer to Section 9E, *Instrumentation/Driver Information*.
6. Replace the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.



## HEATER HOSES

### Removal Procedure

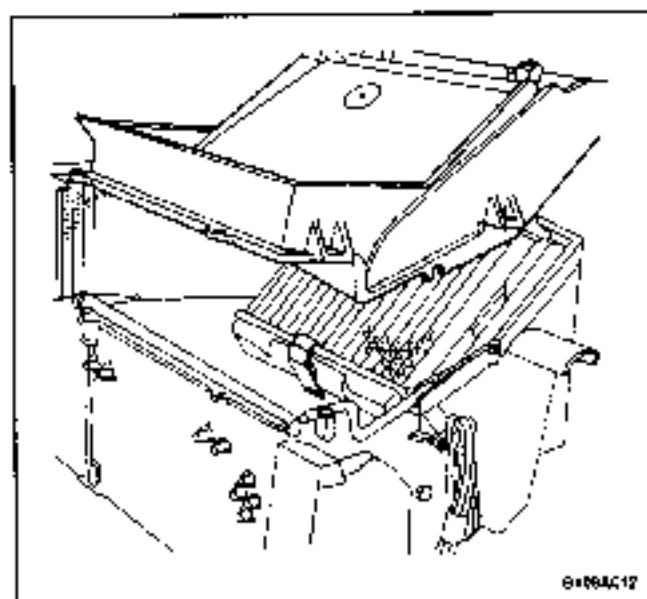
1. Partially drain the cooling system.
2. Raise and suitably support the vehicle.
3. Compress and slide rearward the two heater hose spring clamps at the fire wall.
4. Gently twist the hose from the left to the right and back again to loosen the bond between the hose and the tube.
5. Remove the end of the hose from the tube.
6. Repeat Steps 3 and 4 with the other hose.
7. Compress the heater hose spring clamp on the inlet coolant line and slide the clamp rearward.
8. Remove the heater hose from the vehicle.
9. Compress the heater hose spring clamp at the connection below the intake manifold and slide the clamp rearward.
10. Remove the heater hose from the vehicle.



### Installation Procedure

1. Install the left heater hose to the coolant inlet line fitting. Slide the end of the heater hose over the coolant fitting until the hose is seated.
2. Install the right heater hose to the fitting below the intake manifold. Slide the end of the heater hose over the fitting until it is seated.
3. Install and seat the other end of each heater hose.
4. Compress and slide the spring clamps into position on the heater hoses and release the tension.
5. Fill the cooling system.
6. Check the hoses for leaks.
7. Lower the vehicle.

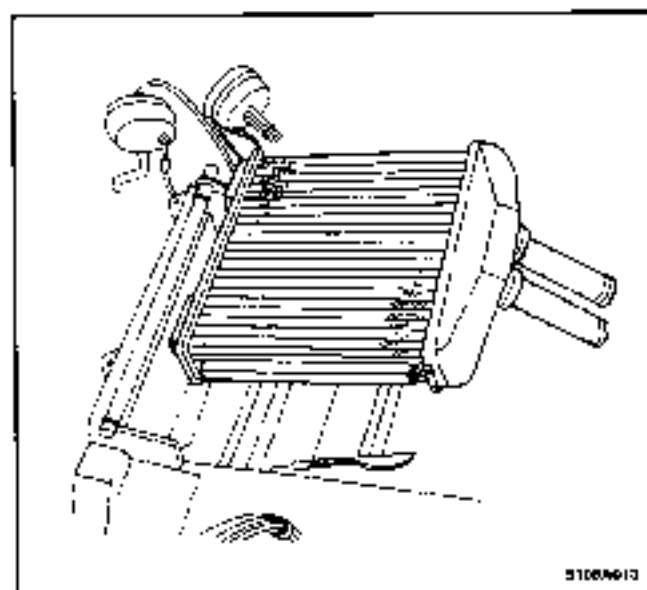




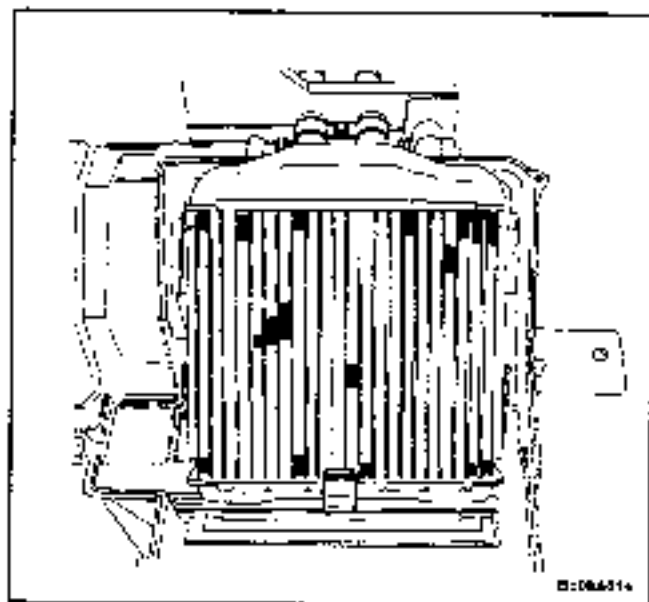
## HEATER CORE

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument panel from the vehicle. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Remove the heater/air distributor case from the vehicle. Refer to "Heater/Air Distributor Case Assembly" in this section.
4. Disconnect the vacuum actuators from the vent floor door and the defroster door.
5. Remove the vacuum actuators from the heater/air distributor case.
6. Remove the screws that secure the heater core cover to the heater/air distributor case assembly.
7. Slowly separate the heater core cover from the rest of the assembly.



8. Remove the screw and the bracket clamp that secure the heater core lines to the case.
9. Remove the spring clamp that secures the heater core body to the case.
10. Remove the heater core from the case.



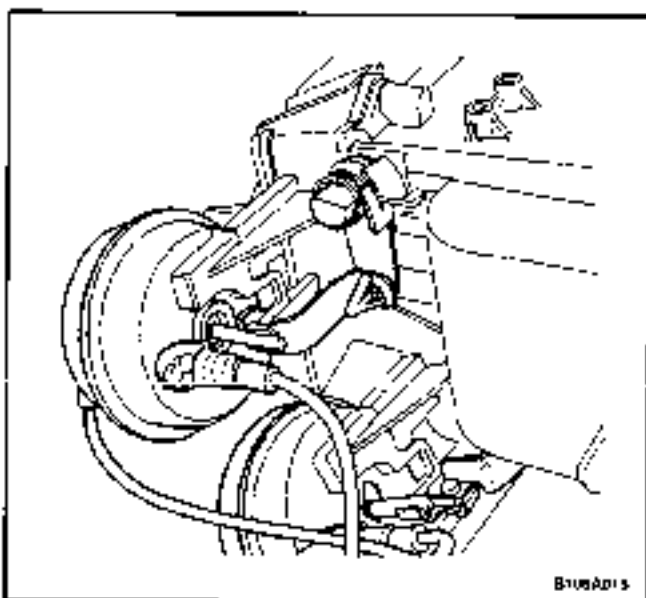
### Installation Procedure

1. Install the heater core into the case.
2. Secure the heater core lines to the case with the retaining bracket clamp and the screw.

### Tighten

Tighten the heater core retaining bracket screw to 3 N•m (27 lb-in).

3. Install the heater core body with the retaining spring clamp.

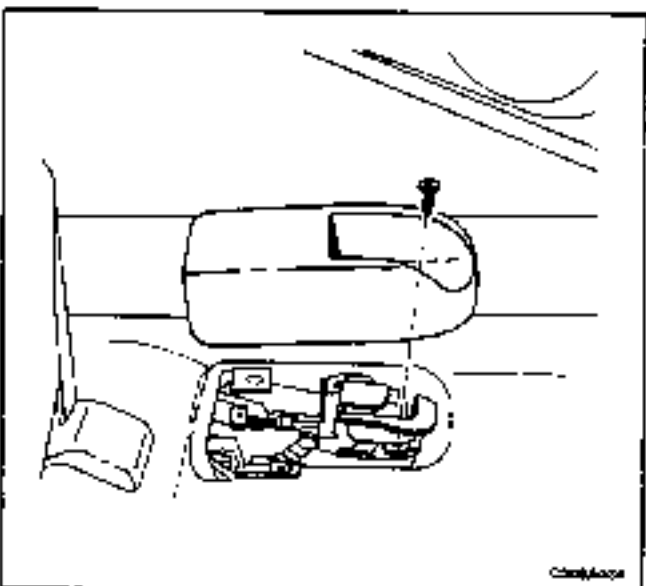


4. Install the heater core cover.
5. Install and tighten the screws that secure the heater core cover to the heater/air distributor case assembly.

### Tighten

Tighten the heater core cover screws to 3 N•m (27 lb-in).

6. Install the actuators for the vent/floor and the defroster doors.
7. Install the heater/air distributor case. Refer to "Heater/Air Distributor Case Assembly" in this section.
8. Install the instrument panel. Refer to Section 9E, Instrumentation/Driver Information.
9. Fill the cooling system.
10. Connect the negative battery cable.

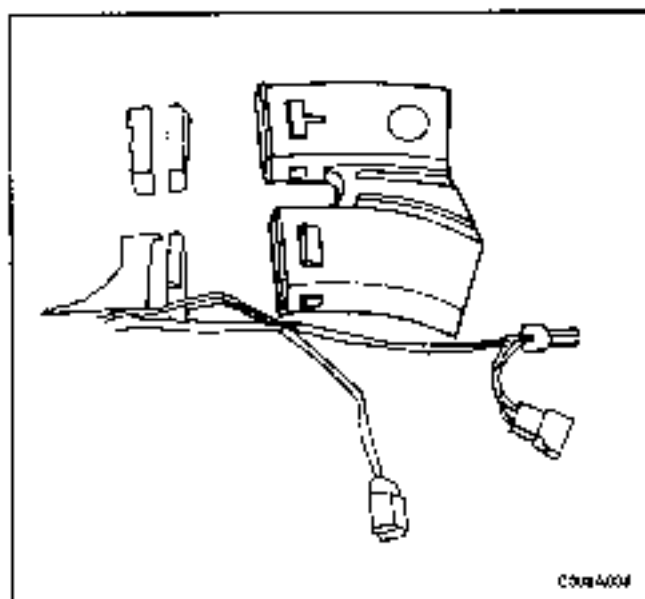


## REAR HEATING DUCT

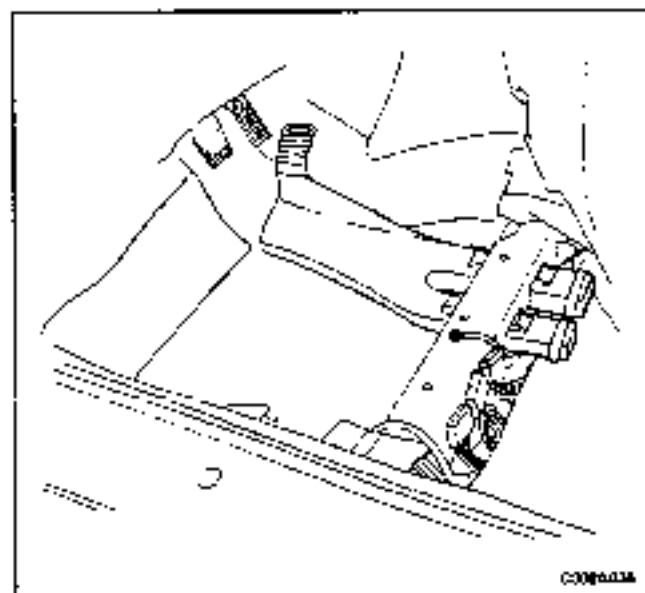
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

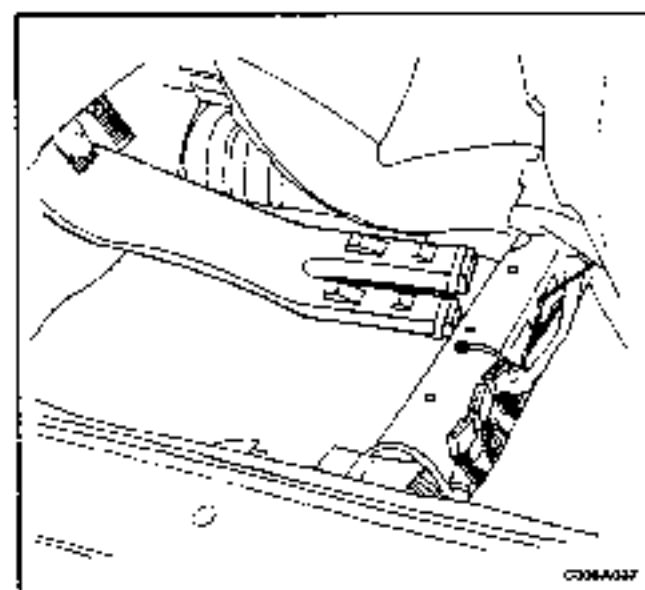
1. Remove the front seat. Refer to Section 9H, Seats.
2. If you are working on the driver side of the vehicle, remove the trim that covers the remote release handles for the fuel door and the rear deck lid, then remove the release handles.
3. Remove the front rocker trim plate. Refer to Section 9C, Front Interior Trim.



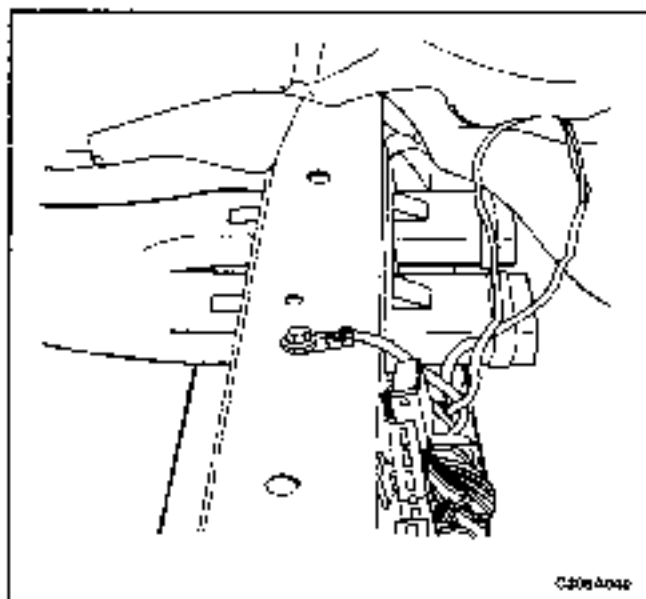
4. Remove the kick panel. Refer to Section 9G, Interior Trim.
5. Remove the rear heating duct outlet extension.



6. Roll the carpet away from the door end of the fire wall, toward the center of the vehicle.
7. Roll the carpet pad toward the center of the vehicle. Uncover the entire heating duct, including the coupling to the air distributor case.

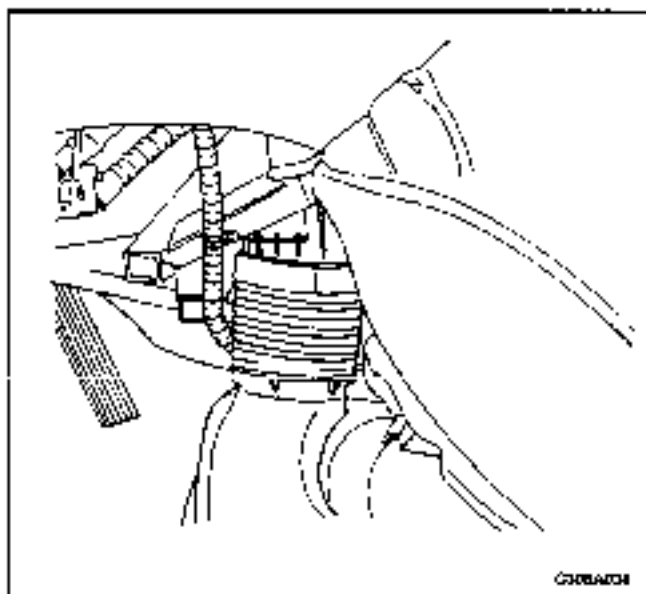


8. Compress and disengage the coupling from the air distributor case.
9. Move the front end of the rear heating duct away from the center of the vehicle.
10. Slide the rear heating duct forward to remove the duct outlets from the openings in the crossmember.
11. Remove the rear heating duct from the vehicle.

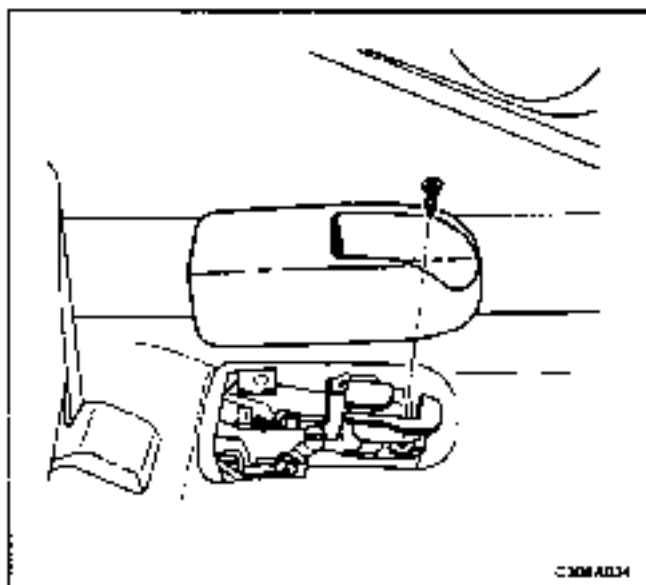


### Installation Procedure

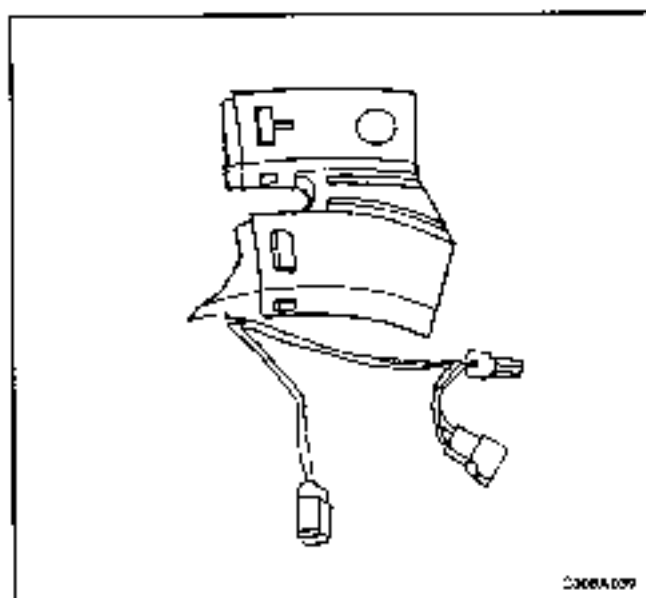
1. Insert the rear heating duct outlets into the holes in the crossmember. Push the duct bullets through the holes until they latch into place.



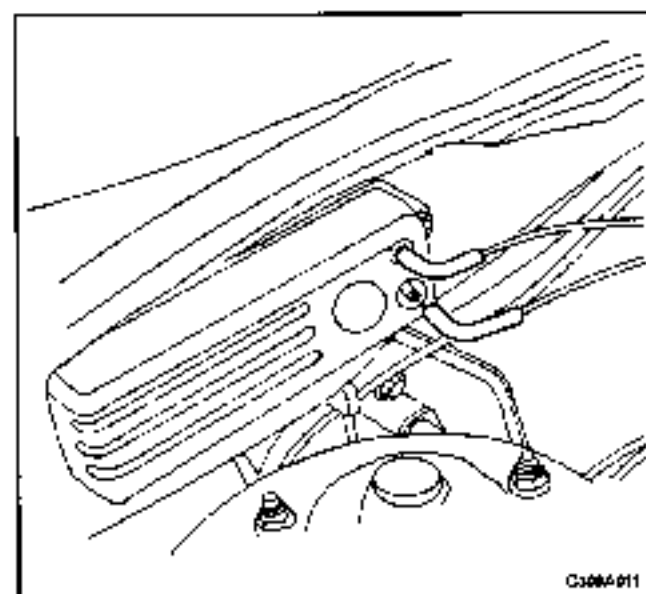
2. Place the air distributor case coupling onto the rear heating duct inlet.
3. Compress the coupling and maneuver the front end of the duct under the outlet of the air distributor case until you can engage the other end of the coupling into that outlet. The duct should be against the vehicle central tunnel. The coupling should completely surround the air distributor case outlet and the rear heating duct inlet.



4. Replace the carpet pad over the floor.
5. Replace the carpet over the floor.
6. Pass any electrical connectors through the opening and maneuver the opening over the rear heating duct outlets so they are exposed.
7. Smooth the carpeting and tuck the edges into place at the door opening in the kick panel area.
8. If you are working on the driver side of the vehicle, smooth the carpeting and tuck the edges into place in the area around the remote release handles for the rear deck lid and the fuel door. Then replace the cover over the remote release handles.



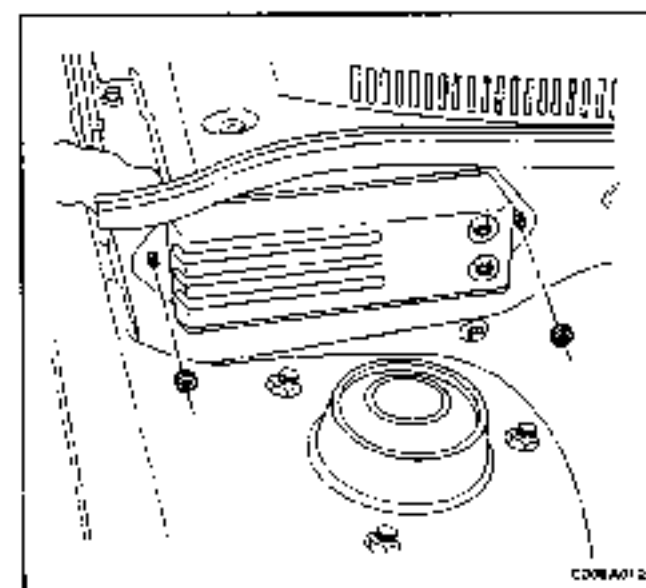
9. Replace the kick panel. Refer to Section 9G, Interior Trim.
10. Replace the rocker trim plate. Refer to Section 9G, Interior Trim.
11. Replace the rear heating duct outlet extension.
12. Replace the front seat. Refer to Section 9H, Seats.

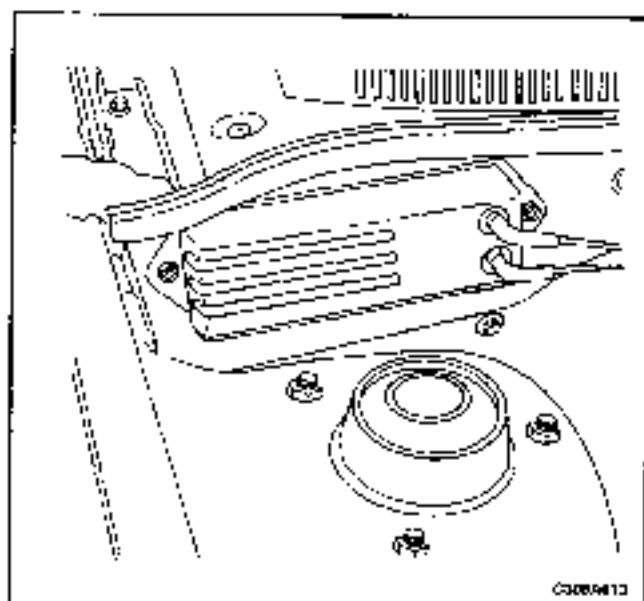


### HVAC CONTROL VACUUM TANK (Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal

1. Disconnect the vacuum hoses that connect to the intake manifold and to the mode control switch.
2. Remove the nuts that secure the vacuum tank to the fire wall.
3. Remove the vacuum tank from the fire wall.





### Installation

1. Place the vacuum tank against the fire wall over the mounting studs.
2. Secure the tank with the mounting nuts.

### Tighten

Tighten the vacuum tank mounting nuts to 4 N•m (35 lb-in).

3. Install the vacuum hoses.

**Important:** The line to the intake manifold goes onto the bottom port, marked **S**. There is a check valve to maintain the vacuum for heater control during temporary losses of vacuum in the intake manifold. If the connections are reversed, the controls will not function properly.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### HEATING AND VENTILATION SYSTEMS

The base heater system is designed to provide heating, ventilation, windshield defrosting, and side window defogging on the models equipped with side window defoggers.

The heater and fan assembly blower regulates the air flow from the air inlet for further processing and distribution.

The heater core transfers the heat from the engine coolant to the inlet air.

The temperature door regulates the amount of the air that passes through the heater core. The temperature door also controls the temperature of the air by controlling the mix of the heated air with the ambient air.

The mode door regulates the flow and the distribution of the processed air to the heater ducts and to the defrost air ducts.

The console-mounted heating and ventilation control panel contains three rotary control knobs and two push control knobs which operate as follows:

#### Rotary Temperature Control Knob

- Actuates by cable.
- Raises the temperature of the air entering the vehicle by rotation toward the right, or the red portion of the knob.

#### Rotary Mode Control Knob

- Actuates by vacuum.
- Regulates the air distribution between the windshield, the instrument panel, and the floor vents.

#### Rotary Blower Control Knob

- Turns ON to operate the blower motor at four speeds.
- Turns OFF to stop the blower.
- Operates completely independently from both the mode control knob and the temperature control knob.
- Changes the fan speed in any mode and at any temperature setting.

#### Rear Window Defogger Push Knob

- Controls the rear window defogger.
- Turns ON the rear window defogger when the push knob is depressed and the indicator lamp is illuminated.

#### Fresh Air Control Push Knob

- Operates by vacuum.
- Switches between recirculating the passenger compartment air and bringing outside air into the passenger compartment.
- Is normally in the fresh air mode.
- Illuminates the indicator lamp when in the recirculating mode.





## SECTION 7D

# AUTOMATIC TEMPERATURE CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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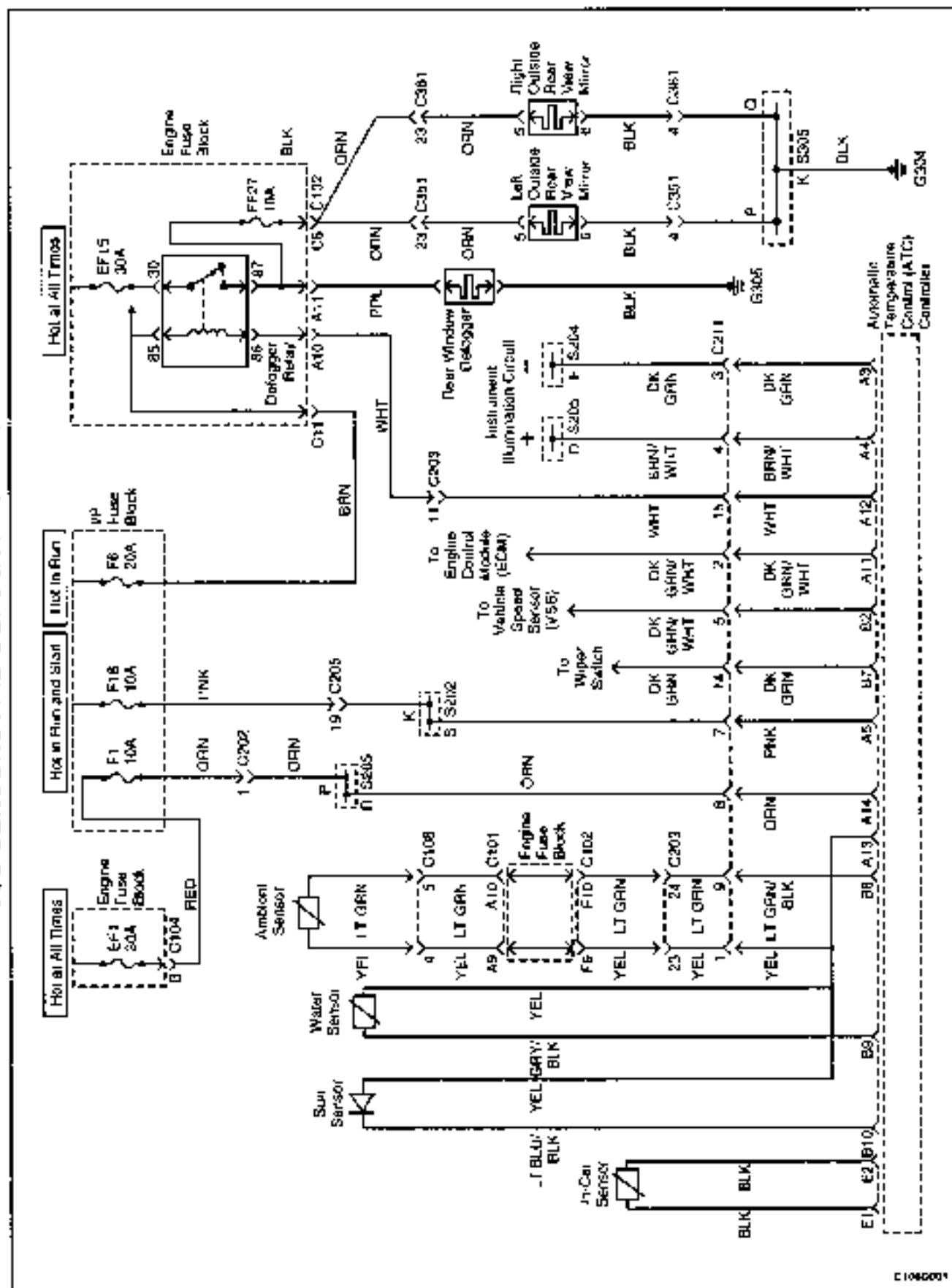
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

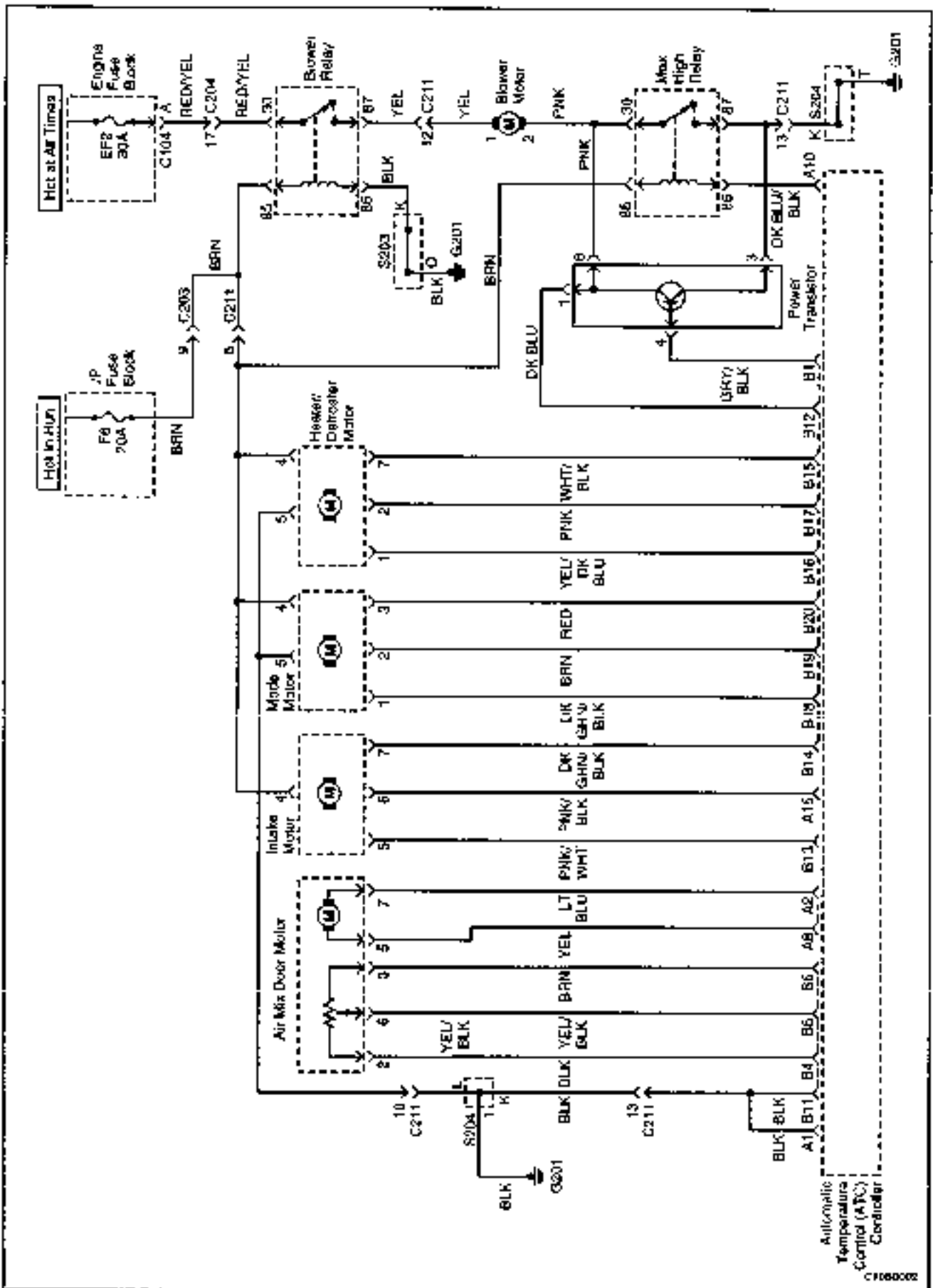
Application	N·m	Lb·Ft	Lb·In
Air Filter Cover Nut	4	-	35
Ambient Air Temperature Retaining Bracket Nut	6	-	53
Blower Motor Resistor Screws	6	-	53
Control Assembly Retaining Screws	4	-	35
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# SCHEMATIC AND ROUTING DIAGRAM

## A/C SENSORS AND DEFOGGER'S DIAGRAM

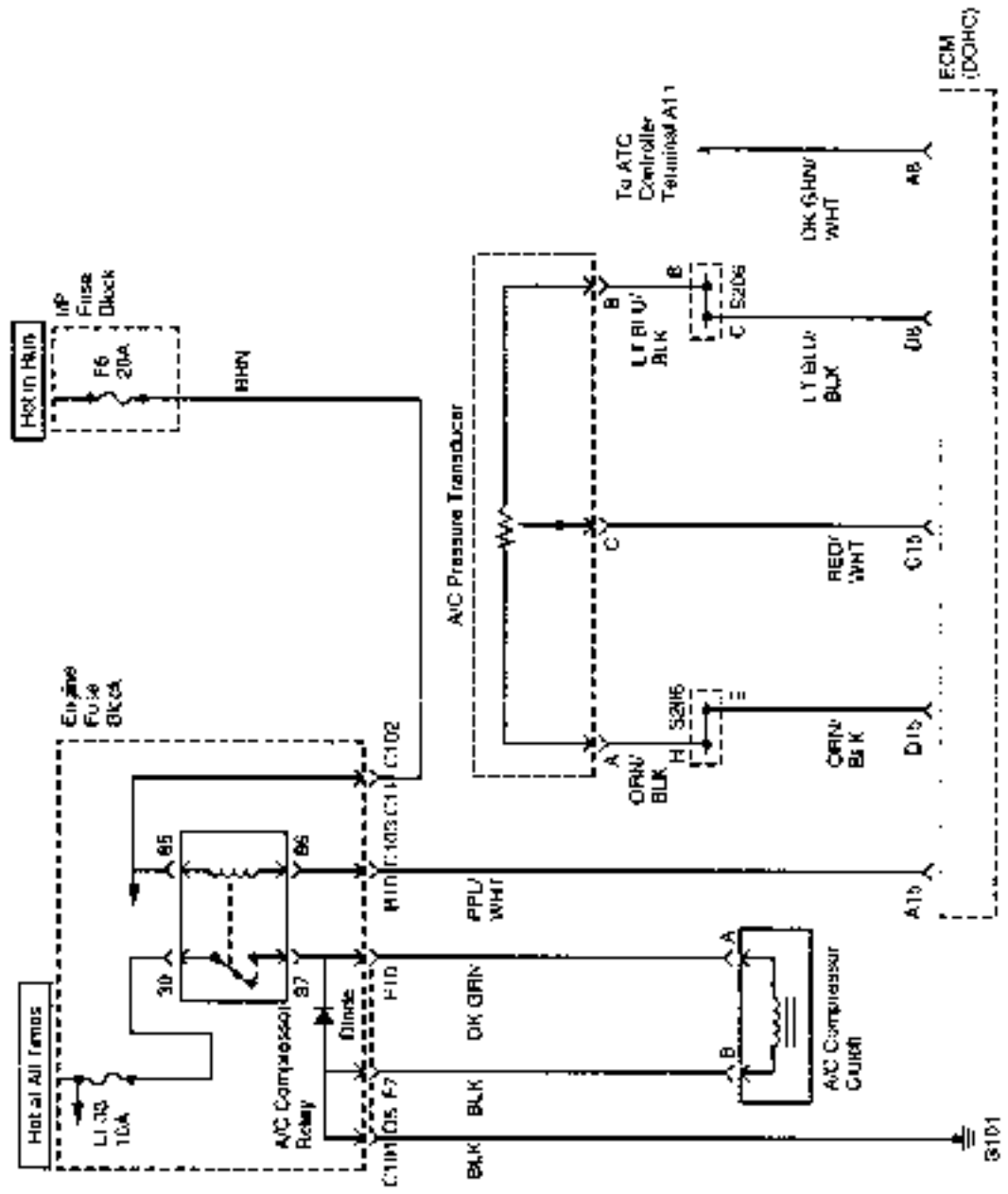


A/C BLOWER AND MOTOR CONTROLS DIAGRAM



C166002

A/C COMPRESSOR CONTROLS DIAGRAM



C10MCP04

## **DIAGNOSIS**

### **GENERAL A/C DIAGNOSTICS**

Refer to Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System for details of the following procedures:

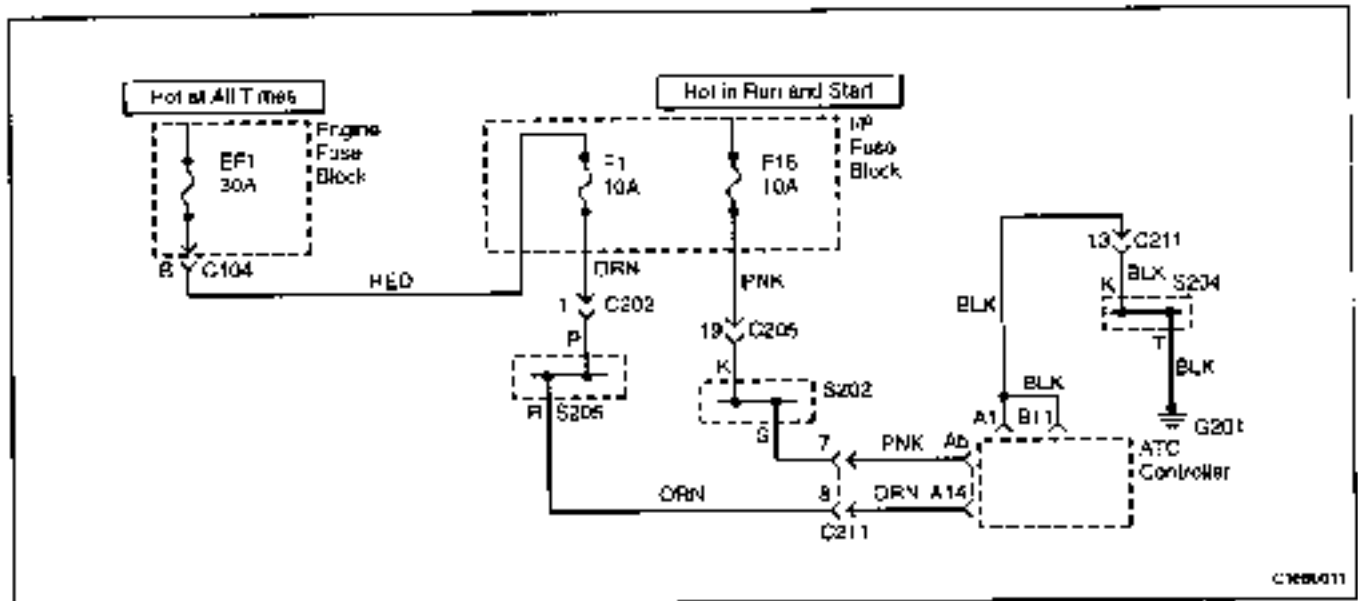
- A/C Performance Test.
- Insufficient Cooling "Quick Check" Procedure
- Insufficient Cooling Diagnosis.
- Leak Testing the Refrigerant System.
- Low- and High-Side Pressure Relationship Chart.
- Pressure Test Chart (R-134a System).
- Pressure-Temperature Relationship of R-134a.
- Testing the Refrigerant System.

## **V5 SYSTEM AIR CONDITIONING AND AUTOMATIC TEMPERATURE CONTROL (ATC)**

### **SELF-DIAGNOSTIC CIRCUIT CHECK**

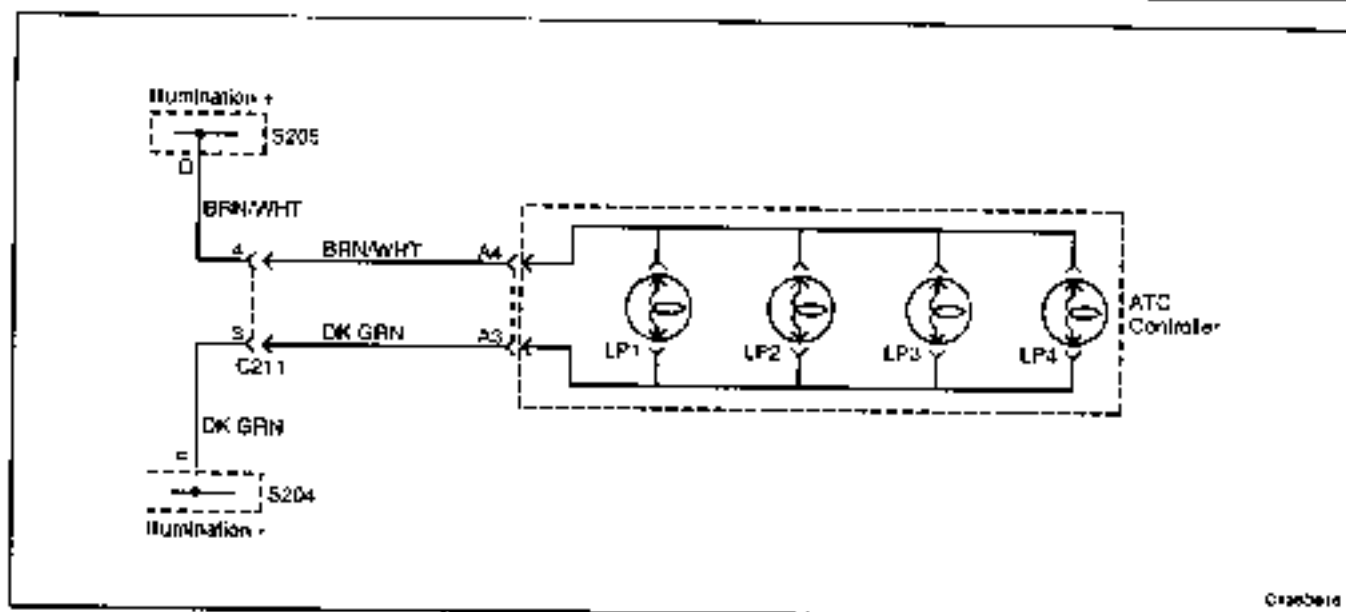
The Daewoo V5ly automatic temperature controller (FATC) contains a self-diagnosis function to aid in finding any problem with the system. To enter the diagnostic mode, perform the following procedure:

1. Turn the ignitor switch ON.
2. Set the temperature control to 26°C (79°F).
3. Within 3 seconds, push the AUTO and the OFF switches simultaneously, more than three times.
4. Count the number of times the temperature indicator screen blinks.
5. If there are no error codes set, the screen will not blink. When the controller indicates an error code, proceed to the table for that code.
6. Push the OFF switch to return the controller to its normal functions.



**AUTOMATIC TEMPERATURE CONTROLLER (ATC) DOES NOT OPERATE WHEN IGNITION IS ON**

Step	Action	Value(s)	Yes	No
1	Check the fuse F18. Is fuse F18 blown?	-	Go to Step 2	Go to Step 3
2	Replace fuse F18. Is the repair complete?	-	System OK	-
3	1. Remove the controller. 2. Measure the voltage between the connectors A5 and A1. Is the voltage as specified?	11-14 v	Go to Step 4	Go to Step 5
4	1. Check the controller for damage 2. Replace the controller if it is damaged. Is the repair complete?	-	System OK	-
5	Check the voltage between terminal A1 and ground. Is this voltage as specified?	0 v	Go to Step 6	Go to Step 7
6	1. Check the wiring harness between fuse F18 and the terminal A5 for damage. 2. Replace the wiring harness if it is damaged. Is the repair complete?	-	System OK	-
7	1. Check the wiring harness between terminal A1 and ground G201 for damage 2. Repair the wiring harness, splice S204, or ground connection as required. Is the repair complete?	-	System OK	-



### CONTROLLER DOES NOT ILLUMINATE WHEN LIGHT SWITCH IS ON

Step	Action	Value(s)	Yes	No
1	Check other instrumentation lights. Are those lights also off?	-	Go to Section 9E, Instrumentation; Driver Information	Go to Step 2
2	1. Remove the controller. 2. Check the voltage between terminals A3 and A4 of the controller connector. Is the voltage within the specified value?	11-14 v	Go to Step 4	Go to Step 3
3	Repair the wiring harness between splice S205 and controller connector terminal A4 or between splice S204 and controller connector terminal A3. Is the repair complete?	-	System OK	-
4	Check the illumination lamps. Is one burned out?	-	Go to Step 5	Go to Step 5
5	Replace the burned out illumination lamp. Is the repair complete?	-	System OK	-



**NO HOT AIR FROM BLOWER**

Step	Action	Value(s)	Yes	No
1	Check the coolant level. Is the coolant level correct?	-	Go to Step 3	Go to Step 2
2	Add coolant as needed Is the heater operating?	-	System OK	Go to Step 3
3	1. Turn the ignition to ON 2. Observe the temperature indication screen of the controller. Does the digit flash on and off?	-	Go to Step 4	Go to Step 5
4	Run a self-diagnosis circuit check Does the display indicate a defect code?	-	Go to the table for the code that flashes	Go to Step 7
5	Observe the blower motor operation Is the blower motor functioning at all?	-	Go to Step 6	Go to "Blower Motor Does Not Run at All"
6	Use the blower push switch to cycle the blower through its different speeds Does the motor function at different speeds?	-	Go to Step 7	Go to "Code 6 - Power Transistor Error"
7	1. Run the blower and operate the MODE push switch manually. 2. Check for airflow out the various outlets. Does the air flow from the different outlets as it should?	-	Go to Step 9	Go to Step 8
8	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions found Is the heater operating?	-	System OK	Go to Step 9
9	Observe the air mix door (AMD) motor while changing the temperature setting from 18 to 32°C (64 to 90°F) and then from 32 to 18°C (90 to 54°F). Is the AMD motor functioning properly?	-	Go to Step 10	Go to "Code 3 - Air Mix Door Error"
10	Check the coolant hoses for leaks or kinks Are the coolant hoses in good condition?	-	Go to Step 12	Go to Step 11
11	Repair any problem with the coolant hoses. Is the heater operating?	-	System OK	Go to Step 12
12	Check the surge tank cap. Is the surge tank cap in good condition?	-	Go to Step 14	Go to Step 13
13	Repair or replace the surge tank cap as needed. Is the heater operating?	-	System OK	Go to Step 14
14	1. Set the A/C switch to OFF. 2. Set the temperature control to 32°C (90°F). 3. Set the blower motor speed to full high (all segments illuminated on the display). 4. Remove the surge tank cap. 5. Start the vehicle and run the engine at idle. 6. Watch for the flow of the coolant when the thermostat opens. Does the coolant flow?	-	Go to Step 16	Go to Step 15

## No Hot Air From Blower (Cont'd)

Step	Action	Value(s)	Yes	No
15	1. Check for <ul style="list-style-type: none"> <li>• A faulty thermostat.</li> <li>• A failed coolant pump impeller.</li> <li>• A restriction in the cooling system.</li> </ul> 2. Make repairs as needed. Is the repair complete?	-	System OK	-
16	Check the temperature of the heater inlet and outlet hoses by feel. Is the heater inlet hose hot and the outlet hose warm?	-	Go to Step 18	Go to Step 17
17	Back flush or replace the heater core. Is the repair complete?	-	System OK	-
18	Check the vehicle for cold air leaks at the <ul style="list-style-type: none"> <li>• Dash.</li> <li>• Heater cases.</li> <li>• Vents</li> </ul> Are any leaks found?	-	Go to Step 20	Go to Step 19
19	Repair any cold air leaks Is the repair complete?	-	System OK	-
20	Check the coolant temperature sensor using the tests in "Code 3 - Coolant Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 21	Go to Step 22
21	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
22	Check the in-car sensor using the tests in "Code 1 - In-Car Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 23	Go to Step 24
23	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
24	Check the ambient air temperature sensor using the tests in "Code 2 - Ambient Air Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 25	Go to Step 26
25	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
26	Check the sun sensor using the tests in "Code 5 - Sun Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 27	Go to Step 28
27	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
28	Replace the ATC controller. Is the repair complete?	-	System OK	-

## NO COOL AIR FROM BLOWER

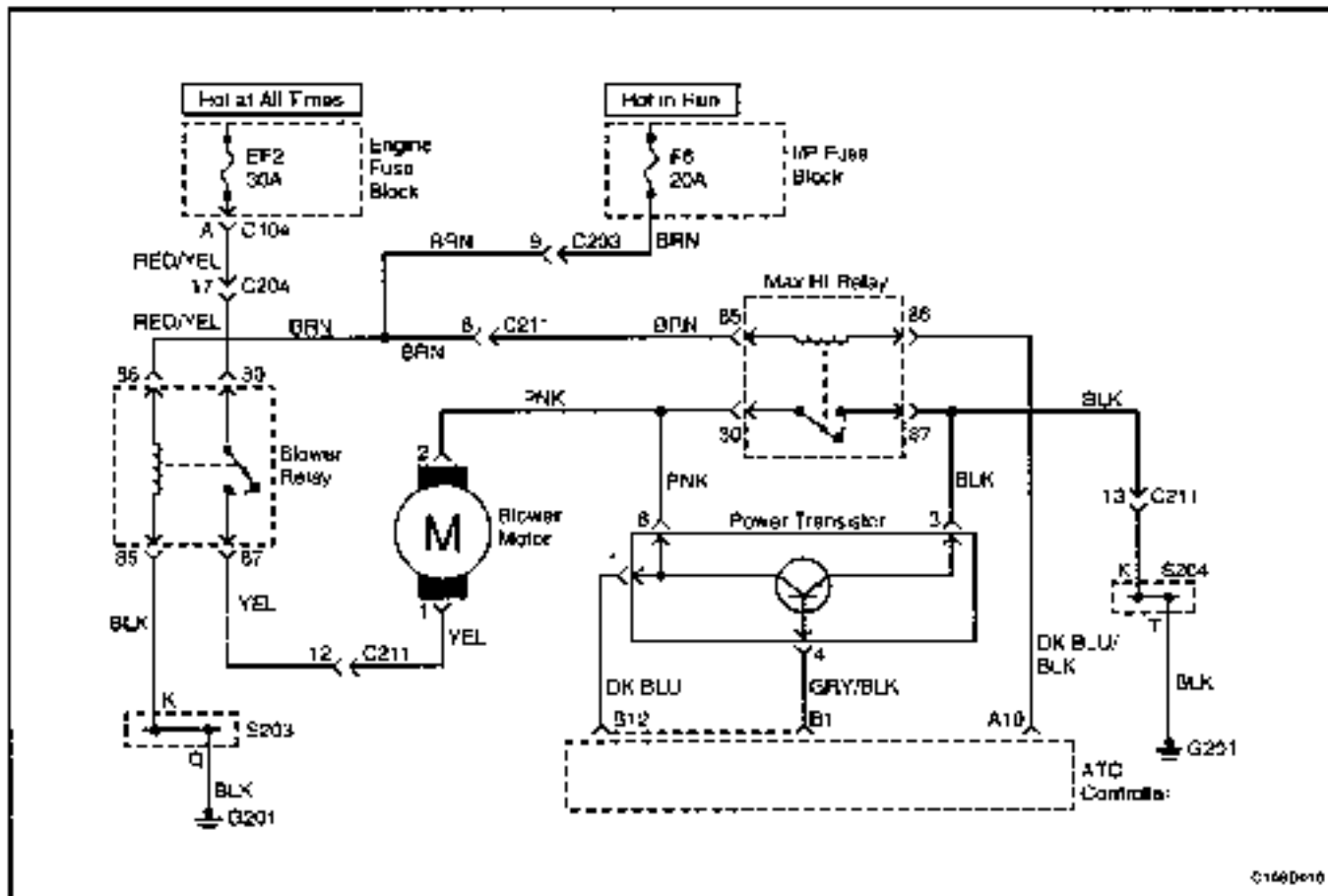
Step	Action	Value(s)	Yes	No
1	1. Turn the ignition to ON. 2. Observe the temperature indication screen of the controller. Does the digit flash on and off?	-	Go to Step 2	Go to Step 3
2	Run a self-diagnosis circuit check. Does the display indicate a defect code?	-	Go to the table for the code that flashes.	Go to Step 7
3	Observe the blower motor operation. Is the blower motor functioning at all?	-	Go to Step 4	Go to 'Blower Motor Does Not Run at All'
4	Use the blower push switch to cycle the blower through its different speeds. Does the motor function at different speeds?	-	Go to Step 5	Go to 'Code 6 Power - Transistor Error'
5	1. Run the blower and operate the MODE push switch manually. 2. Check for airflow out the various outlets. Does the air flow from the different outlets as it should?	-	Go to Step 7	Go to Step 6
6	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions found. Is the heater operating?	-	System OK	Go to Step 9
7	Observe the air mix door motor (AMD) while changing the temperature setting from 18 to 32°C (64 to 90°F) and then from 32 to 18°C (90 to 64°F). Is the AMD motor functioning properly?	-	Go to Step 8	Go to 'Code 3 - Air Mix Door Error'
8	Perform the checks found in "Insufficient Cooling Diagnosis." Is the system operating normally now?	-	System OK	Go to Step 9
9	Place the controller in the AUTO mode. Is smoke taken into the intake part of the in-car sensor?	-	Go to Step 12	Go to Step 10
10	Check the intake hose for the in-car sensor. Is the hose in good condition?	-	Go to Step 12	Go to Step 11
11	Repair or replace the intake hose. Is the repair complete?	-	System OK	-
12	Check the in-car sensor using the tests in "Code 1 - In-Car Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 13	Go to Step 14
13	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
14	Check the ambient air temperature sensor using the tests in "Code 2 - Ambient Air Temperature Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 15	Go to Step 16

**7D - 12 AUTOMATIC TEMPERATURE CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM**

**No Cool Air From Blower (Cont'd)**

Step	Action	Value(s)	Yes	No
15	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
16	Check the sun sensor using the tests in "Code 5 - Sun Sensor Error." Is there a problem indicated in the sensor, the sensor wiring, or the controller?	-	Go to Step 17	Go to Step 19
17	Repair or replace the sensor, the wiring, or the controller as required. Is the repair complete?	-	System OK	-
18	Perform the coolant temperature sensor test Is the coolant temperature sensor malfunctioning?	-	Go to Step 19	Go to Step 20
19	Replace the coolant temperature sensor. Is the repair complete?	-	System OK	-
20	Replace the ATC controller. Is the repair complete?	-	System OK	-

**BLANK**



### BLOWER MOTOR DOES NOT RUN AT ALL

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition to ON. 2. Observe the temperature indication screen of the controller. Does the digit go on and off?	-	Go to Step 2	Go to Step 3
2	Run a self-diagnosis circuit check. Does the display indicate a defect code?	-	Go to the table for the code that flashes.	-
3	Check fuse F6 in the 1/P fuse block. Is this fuse in good condition?	-	Go to Step 5	Go to Step 4
4	Replace fuse F6. Is the repair complete?	-	System OK	-
5	Check fuse EF2 in the engine fuse block. Is the fuse in good condition?	-	Go to Step 7	Go to Step 6
6	Replace fuse EF2. Is the repair complete?	-	System OK	-
7	1. Turn the ignition switch to ON. 2. Measure the voltage between ground and terminal 87 (YEL) of the blower relay. Is the voltage within the specified value?	11-14 v	Go to Step 15	Go to Step 8

## Blower Motor Does Not Run At All (Cont'd)

Step	Action	Value(s)	Yes	No
8	Measure the voltage between ground and terminal 86 (BRN) at the blower relay. Is the voltage within the specified value?	11-14 v	Go to Step 10	Go to Step 9
9	1. Turn the ignition switch to OFF. 2. Check circuit BRN between terminal 86 of the blower relay to F6 in the I/P fuse block. 3. Repair any problem found in the wiring or terminals at the relay socket or connector C203. Is the repair complete?	-	System OK	-
10	Measure the voltage between ground and terminal 30 (RED/YEL) at the blower relay. Is the voltage within the specified value?	11-14 v	Go to Step 12	Go to Step 11
11	1. Turn the ignition switch to OFF. 2. Check circuit RED/YEL between terminal 30 of the blower relay to EF2 in the engine fuse block. 3. Repair any problem found in the wiring or terminals at the fuse block connector C104, connector C204, or at the relay socket. Is the repair complete?	-	System OK	-
12	1. Turn the ignition switch to OFF. 2. Check the continuity in the wiring harness between the blower relay terminal 85 (BLK) and ground. Does the ohmmeter show the specified value?	= 0 $\Omega$	Go to Step 14	Go to Step 13
13	Repair any problem found in terminal 85 at the relay connector, circuit BLK, splice S203, or ground G201. Is the repair complete?	-	System OK	-
14	Replace the blower relay. Is the repair complete?	-	System OK	-
15	1. Turn the ignition switch to OFF. 2. Disconnect the wiring harness at the blower motor. 3. Turn the ignition switch to ON. 4. Measure voltage between ground and blower connector 1 (YEL). Is the voltage within the specified value?	11-14 v	Go to Step 17	Go to Step 16
16	1. Turn the ignition switch to OFF. 2. Check circuit YEL between blower connector terminal 1 and blower relay terminal 87. 3. Repair any problem found in the wiring or a connector terminal at the blower connector, connector C211, or the blower relay socket. Is the repair complete?	-	System OK	-
17	Measure the resistance between the connector terminals on the blower motor. Does the resistance match the specified value?	= 0.5 $\Omega$	Go to Step 19	Go to Step 18

**Blower Motor Does Not Run At All (Cont'd)**

Step	Action	Value(s)	Yes	No
18	Replace the blower motor. Is the repair complete?	-	System OK	-
19	Measure the resistance of circuit PNK between terminal 2 of the blower connector and terminal 3C of the Max HI relay and terminal 6 of the power transistor. Does the resistance match the specified value?	- 0 Ω	Go to Step 21	Go to Step 20
20	Repair the problem in circuit PNK. Is the repair complete?	-	System OK	-
21	Measure the resistance of circuit BLK from terminal 3 of the power transistor connector to ground. Does the resistance match the specified value?	- 0 Ω	Go to Step 23	Go to Step 22
22	1. Trace circuit BLK from terminal 3 of the power transistor connector and terminal B7 of the Max HI relay to ground G201. 2. Repair any problem found in the wiring, connector C211, splice S204, or ground G201. Is the repair complete?	-	System OK	-
23	Replace the ATC controller. Is the repair complete?	-	System OK	-



### MODE CONTROLS DO NOT WORK

Refer to "A/C, Blower and Motor Controls" for the electrical schematic diagram of the circuits described in this procedure.

#### Mode Controls Do Not Work

Step	Action	Value(s)	Yes	No
1	Measure the voltage between terminal 4 and ground of the mode motor and the HTR/DEF motor. Is the voltage within the specified value for both motors?	11-14 v	Go to Step 3	Go to Step 2
2	1. Check the connector and circuit BRN for any wiring or terminal problems. 2. Repair any problems found. Is the repair complete?	-	System OK	-
3	1. Using the Motor Control Table, measure the voltages at the specified terminals of the specified motor connectors. 2. Change the mode settings and observe the voltage changes. Are the voltages as specified?	See the "Motor Control Table"	Go to Step 4	Go to Step 5
4	Replace the motor that does not operate properly. Is the repair complete?	-	System OK	-
5	1. Using the Motor Control Table, measure the voltages at the specified terminals of the specified controller connectors. 2. Change the mode settings and observe the voltage changes. Are the voltages as specified?	See the "Motor Control Table"	Go to Step 6	Go to Step 7
6	1. Check the wiring harness and connectors between the controller and the motor that is not performing properly. 2. Repair or replace the wiring harness or the defective terminal. Is the repair complete?	-	System OK	-
7	Check the connector at the controller. Is there a defective terminal?	-	Go to Step 8	Go to Step 9
8	Repair or replace the terminal. Is the repair complete?	-	System OK	-
9	Replace the controller. Is the repair complete?	-	System OK	-

Motor Control Table

Mode Setting	Mode Motor			HTR/DEF Motor		
	Connector Terminal					
	Controller/ Motor	Controller/ Motor	Controller/ Motor	Controller/ Motor	Controller/ Motor	Controller/ Motor
	B20/3	B19/2	B18/1	B17/2	B16/1	B15/7
Vent	11-14 v	11-14 v	0 v	0 v	11-14 v	11-14 v
Br-Level	11-14 v	0 v	11-14 v	11-14 v	11-14 v	0 v
Foat	0 v	11-14 v	11-14 v	11-14 v	11-14 v	0 v
Foat/Defrost	0 v	11-14 v	11-14 v	11-14 v	0 v	11-14 v
Derms	0 v	11-14 v	11-14 v	0 v	11-14 v	11-14 v

**AIR SOURCE SELECTION NOT CONTROLLED**

Refer to 'A/C, Blower and Motor Controls' for the electrical schematic diagram of the circuits described in this procedure.

**Air Source Selection Not Controlled**

Step	Action	Value(s)	Yes	No
1	Measure the voltage at terminal 4 of the intake motor. Is the voltage within the value specified?	11-14 v	Go to Step 3	Go to Step 2
2	1. Check the connector and circuit BRN for any wiring or terminal problems. 2. Repair any problems found Is the repair complete?	-	System OK	-
3	1. Using the Intake Motor Table, measure the voltages at the specified terminals of the motor connector 2. Change the intake setting and observe the voltage changes. Are these voltages within the specified value?	See the 'Intake Motor Table'	Go to Step 4	Go to Step 5
4	Replace the intake motor. Is the repair complete?	-	System OK	-
5	1. Using the Intake Motor Table, measure the voltages at the specified terminals of the controller connector 2. Change the intake setting and observe the voltage changes. Are these voltages within the specified value?	See the 'Intake Motor Table'	Go to Step 6	Go to Step 7
6	1. Check the wiring harness and connectors between the controller and the motor that is not performing properly. 2. Repair or replace the wiring harness or the defective terminal. Is the repair complete?	-	System OK	-
7	Check the connector at the controller. Is there a defective terminal?	-	Go to Step 8	Go to Step 9
8	Repair or replace the terminal. Is the repair complete?	-	System OK	-
9	Replace the controller. Is the repair complete?	-	System OK	-

**Intake Control Table**

Intake Setting	Intake Motor		
	Connector Terminal		
	Controller/Motor	Controller/Motor	Controller/Motor
	B14/7	A15/6	B13/5
Recirculate	0 v	11-14 v	11-14 v
1/3 Fresh	11-14 v	0 v	11-14 v
Fresh	11-14 v	11-14 v	0 v

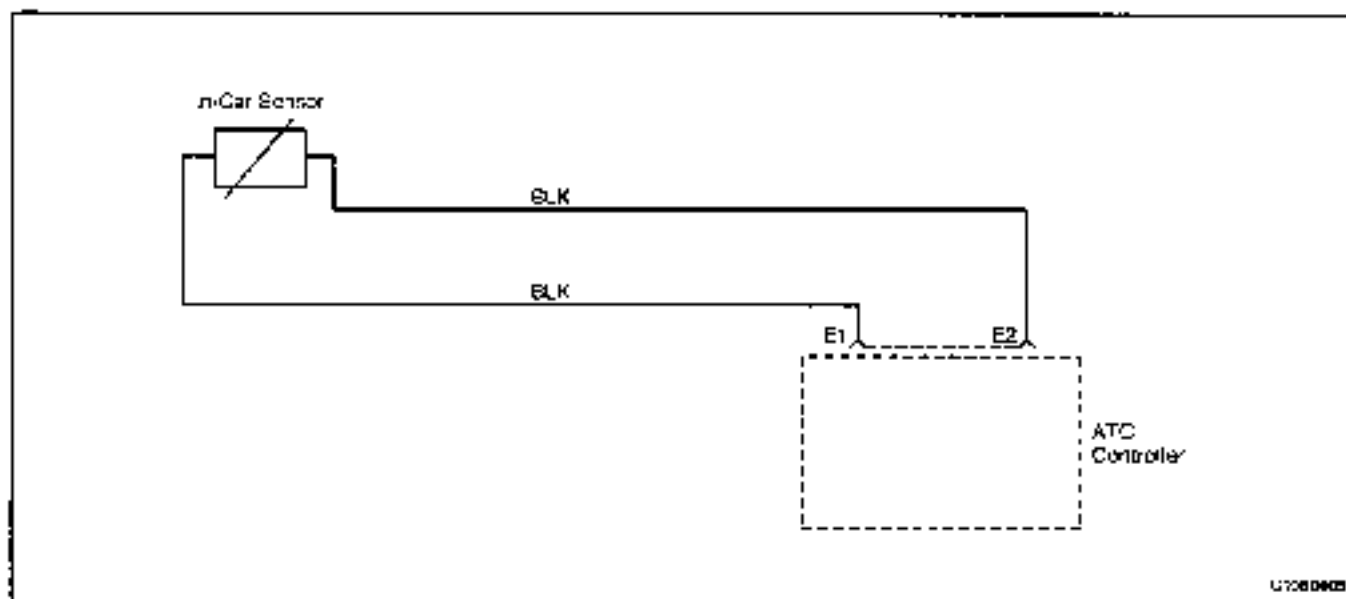
**COMPRESSOR MAGNETIC CLUTCH DOES NOT ENGAGE**

Refer to 'A/C, Compressor Controls (DOHC)' for the electrical schematic diagram of the circuits described in this procedure.

**Compressor Magnetic Clutch Does not Engage**

Step	Action	Value(s)	Yes	No
1	1 Remove the ATC Controller from the instrument panel, keeping the wiring harness connected 2 Turn the ignition switch to ON. 3 Turn the A/C switch to ON. 4 Check the voltage between ground and terminal A11 on the controller. Is the voltage within the specified value?	11-14 v	Go to 'Insufficient Cooling Diagnosis'	Go to Step 2
2	Replace the ATC controller Is the repair complete?	-	System OK	-

## DIAGNOSTIC TROUBLE CODES



### CODE 1 - IN-CAR SENSOR ERROR

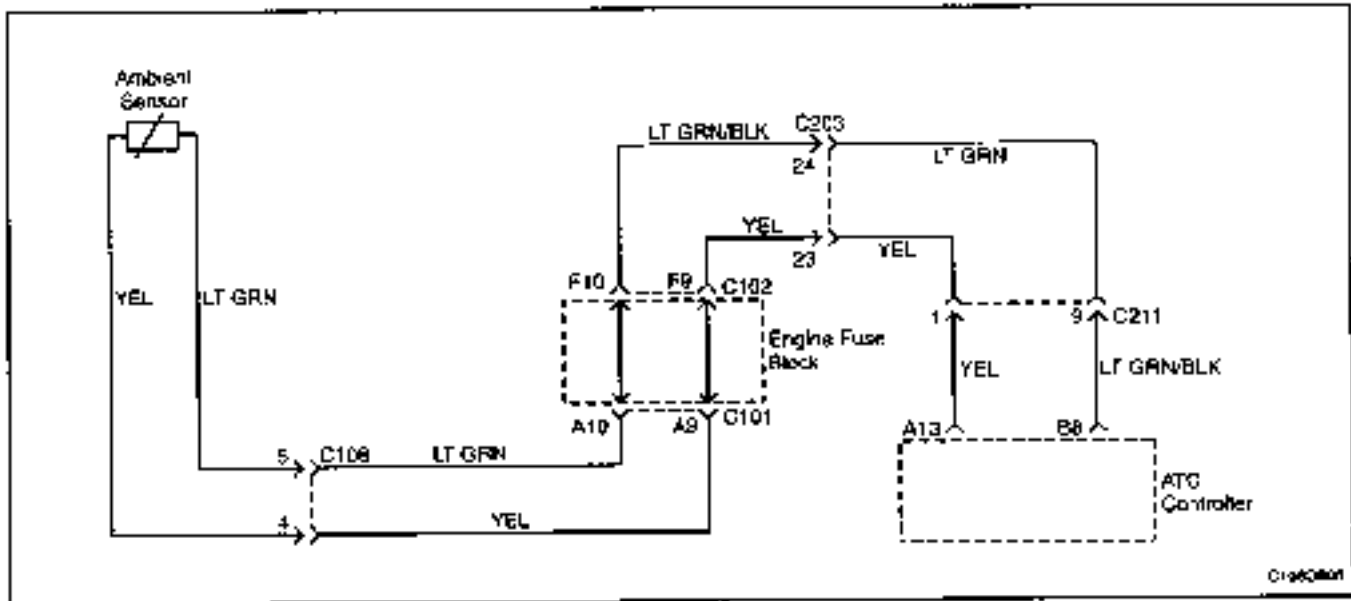
This code will set if the output of the in-car sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

#### Code 1 - In-Car Sensor Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the in-car sensor connector from the ATC controller. 2. Examine the wiring from the sensor to the connector and the connector for any signs of damage. 3. Measure the resistance between the in-car sensor connector terminals. Is there any sign of damage in the wiring or connector, or is the resistance outside the specified value at 20 to 25°C (68 to 77°F)?	2600-2100 Ω	Go to Step 2	Go to Step 3
2	Repair the damaged wiring or the connector, or replace the in-car sensor as required. Is the repair complete?	-	System OK	-
3	1. Turn the ignition to ON. 2. Measure the voltage between the two connector terminals on the controller housing. Is the voltage equal to the value specified?	> 4 V	Go to Step 7	Go to Step 4
4	Check the terminals on the in-car sensor connector. Is any problem found with the connector?	-	Go to Step 5	Go to Step 6
5	Repair the connector terminals or replace the in-car sensor or ATC controller as required. Is the repair complete?	-	System OK	-

**Code 1 - In-Car Sensor Error (Cont'd)**

<b>Step</b>	<b>Action</b>	<b>Value(s)</b>	<b>Yes</b>	<b>No</b>
6	1. Reconnect the in-car sensor to the controller. 2. Turn the ignition switch to ON 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 1 condition?	-	Go to Step 7	System OK
7	Replace the ATC controller. Is the repair complete?	-	System OK	-



## CODE 2 - AMBIENT AIR TEMPERATURE SENSOR ERROR

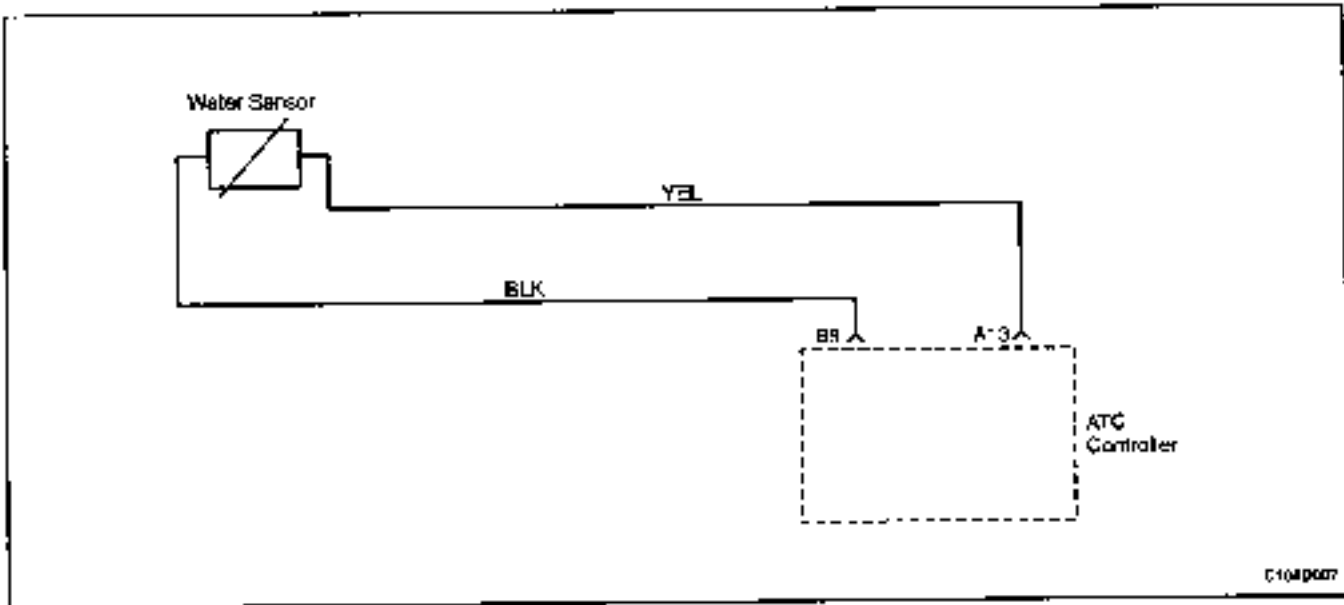
This code will set if the output of the ambient air temperature sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

### Code 2 - Ambient Air Temperature Sensor Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the ambient air sensor connector from the front bumper harness. 2. Measure the resistance between the ambient air sensor connector terminals. Is the resistance equal to the specified value at 20 to 25°C (68 to 77°F)?	2000-2100 Ω	Go to Step 5	Go to Step 2
2	1. Remove the ambient air sensor from behind the front bumper. 2. Examine the wiring for any open or short and examine the connector for any damage. Is there a problem with the wiring or the connector?	-	Go to Step 3	Go to Step 4
3	Repair the problems found in the ambient air sensor wiring or the connector. Is the repair complete?	-	System OK	-
4	Replace the ambient air sensor. Is the repair complete?	-	System OK	-
5	1. Turn the ignition to ON. 2. Measure the voltage between the two terminals in the ambient air sensor connector on the front bumper harness. Is the voltage equal to the value specified?	> 4 v	Go to Step 7	Go to Step 6
6	1. Reconnect the in-car sensor to the controller. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 2 condition?	-	Go to Step 8	System OK

**Code 2 - Ambient Air Temperature Sensor Error (Cont'd)**

Step	Action	Value(s)	Yes	No
7	1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B8 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to Step 8	Go to Step 9
8	Replace the ATC Controller. Is the repair complete?	-	System OK	-
9	1. Trace the wiring for the ambient air sensor from the ATC controller, through connectors C211, C203, C101 and C102 at the engine fuse block, and C108 to the ambient air sensor connector on the front burner harness. 2. Repair any open or high resistance condition in the wiring or a connector terminal. Is the repair complete?	-	System OK	-



### CODE 3 - COOLANT TEMPERATURE SENSOR ERROR

This code will set if the output of the coolant sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

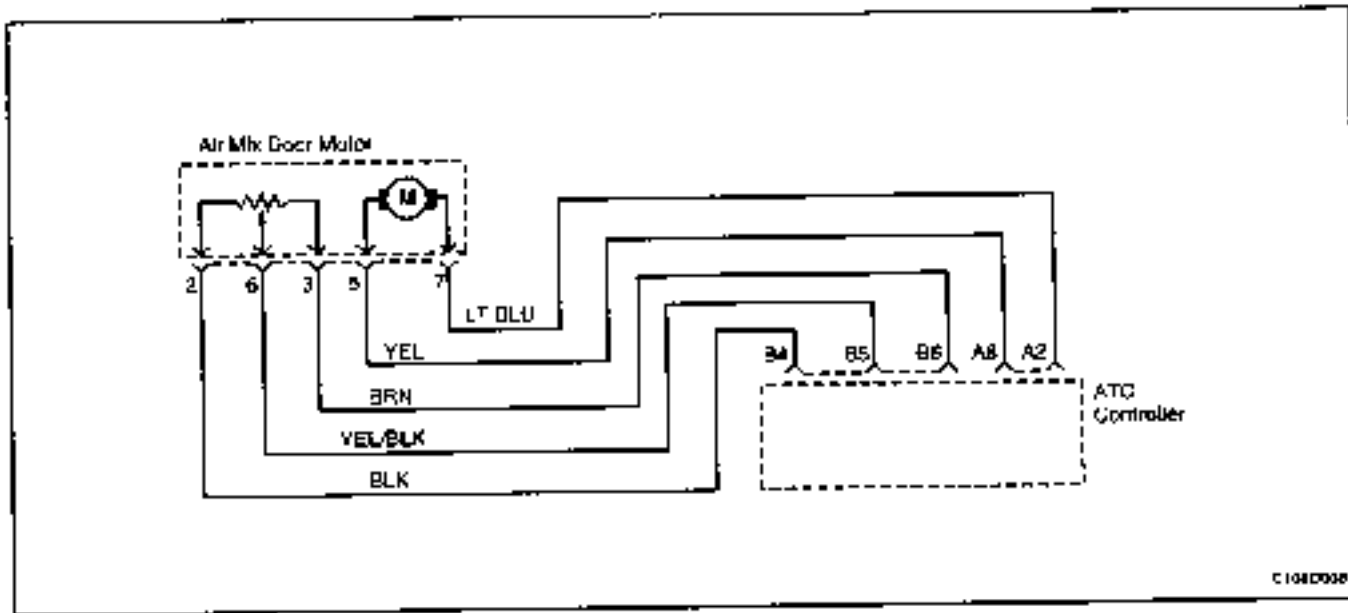
#### Code 3 - Coolant Temperature Sensor Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the coolant temperature sensor connector from the ATC harness. 2. Examine the wiring from the sensor to the connector and examine the connector for any signs of damage. 3. Measure the resistance between the coolant temperature sensor connector terminals. Is there any sign of damage in the wiring or the connector, or is the resistance outside the specified value at 20 to 25°C (68 to 77°F)?	2600-2100 Ω	Go to Step 2	Go to Step 3
2	Repair the damaged wiring or the connector, or replace the coolant temperature sensor as required. Is the repair complete?	-	System OK	-
3	1. Turn the ignition to ON. 2. Measure the voltage between the two coolant temperature sensor connector terminals on the ATC harness. Is the voltage equal to the value specified?	< 4 v	Go to Step 7	Go to Step 4
4	Check the terminals on the coolant temperature sensor connector. Is any problem found with the connector?	-	Go to Step 5	Go to Step 6
5	Repair the connector terminals or replace the coolant temperature sensor or ATC controller as required. Is the repair complete?	-	System OK	-



**Code 3 - Coolant Temperature Sensor Error (Cont'd)**

Step	Action	Value(s)	Yes	No
6	1. Reconnect the coolant temperature sensor to the ATC harness. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 3 condition?	-	Go to Step 9	System OK
7	1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B9 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to Step 9	Go to Step 8
8	1. Trace the wiring from controller terminals A13 and B9 to the coolant temperature sensor connector terminals or the ATC harness connectors. 2. Repair any open or high resistance found in the wiring or connector terminals. Is the repair complete?	-	System OK	-
9	Replace the ATC controller. Is the repair complete?	-	System OK	-



### CODE 4 - AIR MIX DOOR ERROR

This code will set if the output of the mix door indicator indicates that the door opening angle is out of range or does not change value when the door should be moving. This would indicate a short circuit or an open in the sensor or the associated wiring harness, a door motor that is not operating, or a malfunction of the ATC controller.

#### Code 4 - Air Mix Door Error

Step	Action	Value(s)	Yes	No
1	1. Disconnect the I/P wiring harness connector from the air mix door (AMD) motor. 2. Use an ohmmeter to measure the resistance between terminals 5 and 7 on the AMD motor. Does the measured resistance indicate an open or a shorted condition?	Open = ∞, Short = 0 Ω	Go to Step 4	Go to Step 2
2	Measure the resistance between terminals 2 and 3 on the AMD motor. Is the resistance equal to the value specified?	≈ 3000 Ω	Go to Step 3	Go to Step 4
3	Measure the resistance between terminals 6 and 2 and between terminals 6 and 3 on the AMD motor. Do these resistances add to approximately the value measured between terminals 2 and 3?	≈ 3000 Ω	Go to Step 5	Go to Step 4
4	Replace the AMD motor. Is the repair complete?	-	System OK	-
5	Check the connector terminals at the AMD motor and the wiring in the ATC harness. Is there a problem with any terminal on either the harness connector or the motor connector or the wiring?	-	Go to Step 6	Go to Step 7
6	Repair the problem found with a connector terminal or the wiring, or replace the motor as required. Is the repair complete?	-	System OK	-

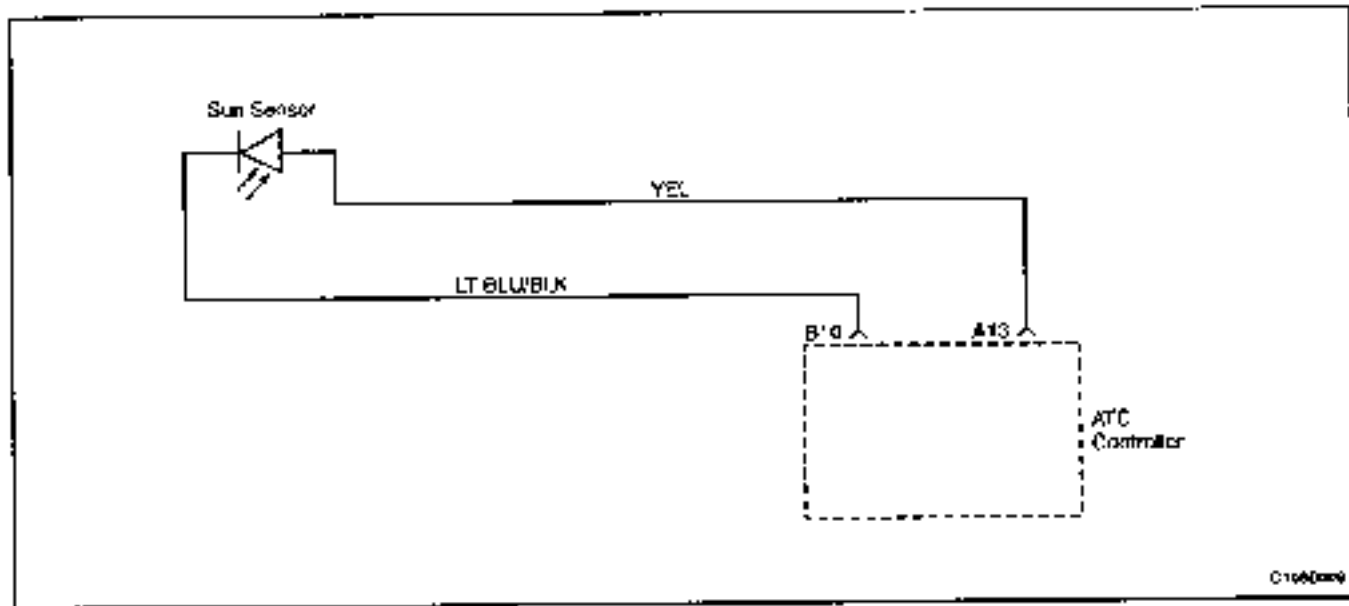
## Code 4 - Air Mix Door Error (Cont'd)

Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> <li>1. Remove the ATC controller from the instrument panel.</li> <li>2. Disconnect the harness connectors from the ATC controller.</li> <li>3. Examine the connector terminals on the harness connectors and the controller connectors and the harness wiring.</li> </ol> Is there a problem with any of these connectors or the wiring?	-	Go to Step 8	Go to Step 9
8	Repair the problem found with a connector terminal or wiring. Is the repair complete?	-	System OK	-
9	Check continuity in the harness between the controller connectors and the AMD motor connector. <ul style="list-style-type: none"> <li>• Controller terminal A2 to motor terminal 7</li> <li>• Controller terminal A8 to motor terminal 5.</li> <li>• Controller terminal B4 to motor terminal 2.</li> <li>• Controller terminal B5 to motor terminal 6.</li> <li>• Controller terminal B6 to motor terminal 3</li> </ul> Does the continuity equal the specified value?	- 0 Ω	Go to Step 10	Go to Step 11
10	Repair the continuity problem. Is the repair complete?	-	System OK	-
11	<ol style="list-style-type: none"> <li>1. Reconnect the AMD motor to the ATC harness.</li> <li>2. Reconnect the ATC harness connectors to the controller.</li> <li>3. Turn the ignition to ON.</li> <li>4. Use backprobing for voltage measurements.</li> <li>5. Measure the voltage between ground and terminal B5 at the controller.</li> </ol> Is the voltage equal to the specified value?	< 4 v	Go to Step 12	Go to Step 14
12	<ol style="list-style-type: none"> <li>1. Set the temperature controller to 18°C (64°F).</li> <li>2. Connect a voltmeter between ground and terminal A8 at the controller. It should display about 12 v.</li> <li>3. Raise the temperature setting on the controller to 32°C (90°F).</li> </ol> Does the voltage equal the specified value?	Drops from 12 v to 0 v	Go to Step 13	Go to Step 15
13	<ol style="list-style-type: none"> <li>1. Connect a voltmeter between ground and terminal A2 at the controller. It should display about 12 v.</li> <li>2. Change the temperature setting to 18°C (64°F).</li> </ol> Does the voltage equal the specified value?	Drops from 12 v to 0 v	Go to Step 20	Go to Step 15
14	<ol style="list-style-type: none"> <li>1. Recheck the wiring harness and the connector terminals associated with controller terminals B4, B5, and B6, and AMD motor terminals 2, 6, and 3.</li> <li>2. Repair any problem found.</li> </ol> Is the repair complete?	-	System OK	-
15	Recheck all wiring circuits between the controller and the AMD motor. Is there a problem in the wiring or the connectors?	-	Go to Step 16	Go to Step 17

## Code 4 - Air Mix Door Error (Cont'd)

Step	Action	Value(s)	Yes	No
16	Repair the problem in the wiring between the ATC controller and the AMD motor. Is the repair complete?	-	System OK	-
17	Recheck the AMD motor. Is there a problem in the AMD motor?	-	Go to Step 18	Go to Step 19
18	Replace the AMD motor. Is the repair complete?	-	System OK	-
19	Replace the controller. Is the repair complete?	-	System OK	-
20	Observe the operation of the air mix door when the temperature setting is changed. Does the door move normally?	-	Go to Step 22	Go to Step 21
21	Repair or replace the air mix door. Is the repair complete?	-	System OK	-
22	Observe the operation of the AMD motor when the temperature setting is changed. Does the motor operate normally?	-	Go to Step 24	Go to Step 23
23	Replace the AMD motor. Is the repair complete?	-	System OK	-
24	Reconnect everything and test the system. Does code 4 reset?	-	Go to Step 25	System OK
25	Replace the controller. Is the repair complete?	-	System OK	-

**BLANK**



### CODE 5 - SUN SENSOR ERROR

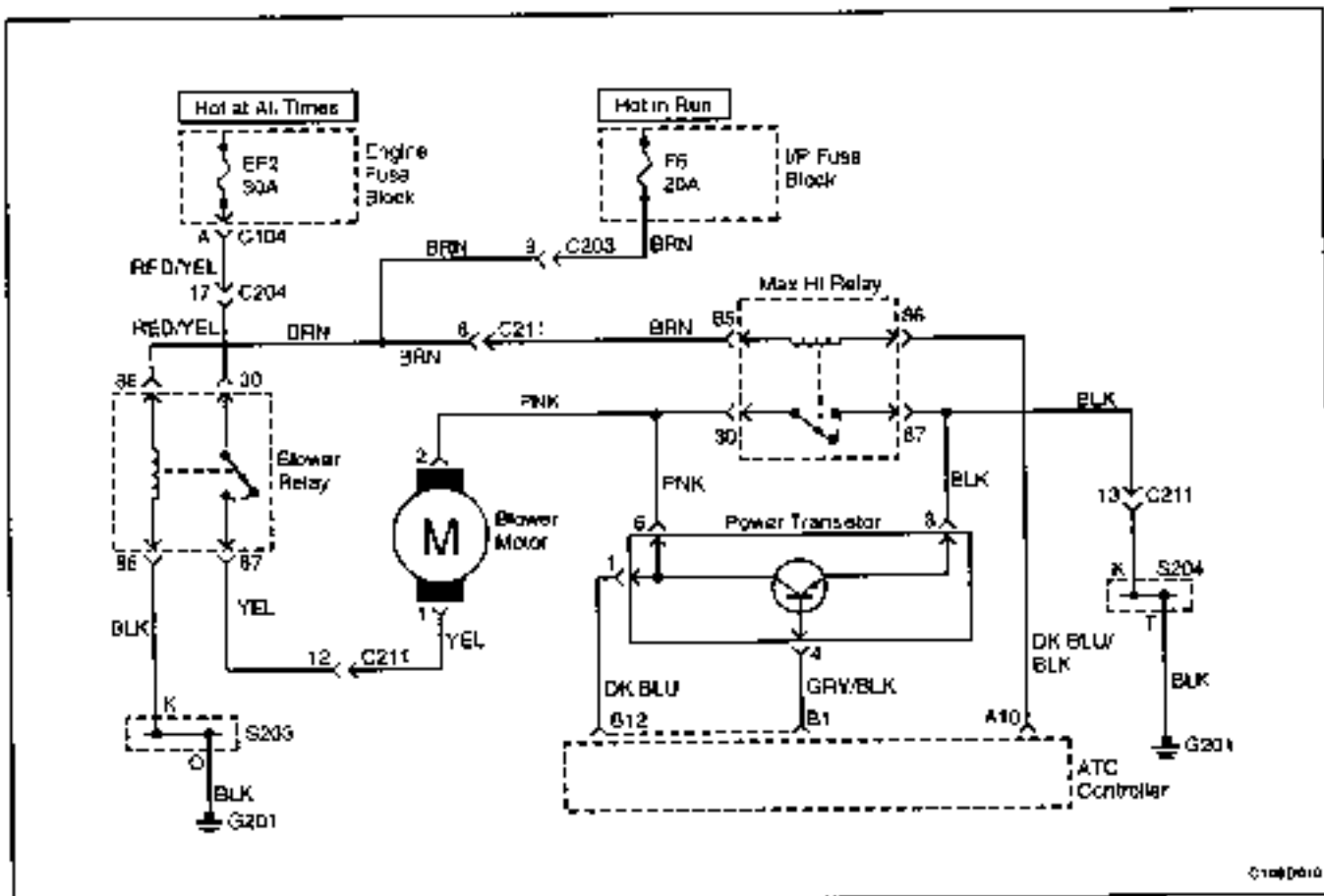
This code will set if the output of the sun sensor indicates a probable short circuit or an open in the sensor or the associated wiring harness, or a malfunction of the ATC controller.

#### Code 5 - Sun Sensor Error

Step	Action	Value(s)	Yes	No
1	1. Lift the sun sensor from the top of the dashboard. 2. Secure the ATC harness below the sun sensor connector so it cannot fall through the opening in the top of the dashboard. 3. Disconnect the sun sensor connector from the ATC harness. 4. Examine the wiring from the sensor to the connector, and examine the connector for any signs of damage. 5. Measure the resistance between the sun sensor connector terminals. Is there any sign of damage in the wiring or connector or does the resistance equal the value specified?	$\approx 0 \Omega$	Go to Step 2	Go to Step 3
2	Repair the damaged wiring or the connector, or replace the sun sensor as required. Is the repair complete?	-	System OK	-
3	1. Turn the ignition to ON. 2. Measure the voltage between the two sun sensor connector terminals on the ATC harness. Is the voltage equal to the value specified?	$< 4 \text{ V}$	Go to Step 7	Go to Step 4
4	Check the terminals on the sun sensor connector. Is any problem found with the connector?	-	Go to Step 5	Go to Step 6
5	Repair the connector terminals or replace the sun sensor or ATC controller as required. Is the repair complete?	-	System OK	-

## Code 5 - Sun Sensor Error (Cont'd)

Step	Action	Value(s)	Yes	No
6	1. Reconnect the sun sensor to the ATC harness. 2. Turn the ignition switch to ON. 3. Observe the temperature display area. Does this display indicate the continuing presence of a code 5 condition?	-	Go to Step 9	System OK
7	1. Pull the ATC controller from the instrument panel, leaving the wiring harness connected. 2. Measure the voltage between terminals A13 and B10 by backprobing the connectors. Is the voltage equal to the value specified?	< 4 v	Go to Step 9	Go to Step 8
8	1. Trace the wiring from controller terminals A13 and B10 to the sun sensor connector terminals on the ATC harness connectors. 2. Repair any open or high resistance found in the wiring or connector terminals. Is the repair complete?	-	System OK	-
9	Replace the ATC controller. Is the repair complete?	-	System OK	-



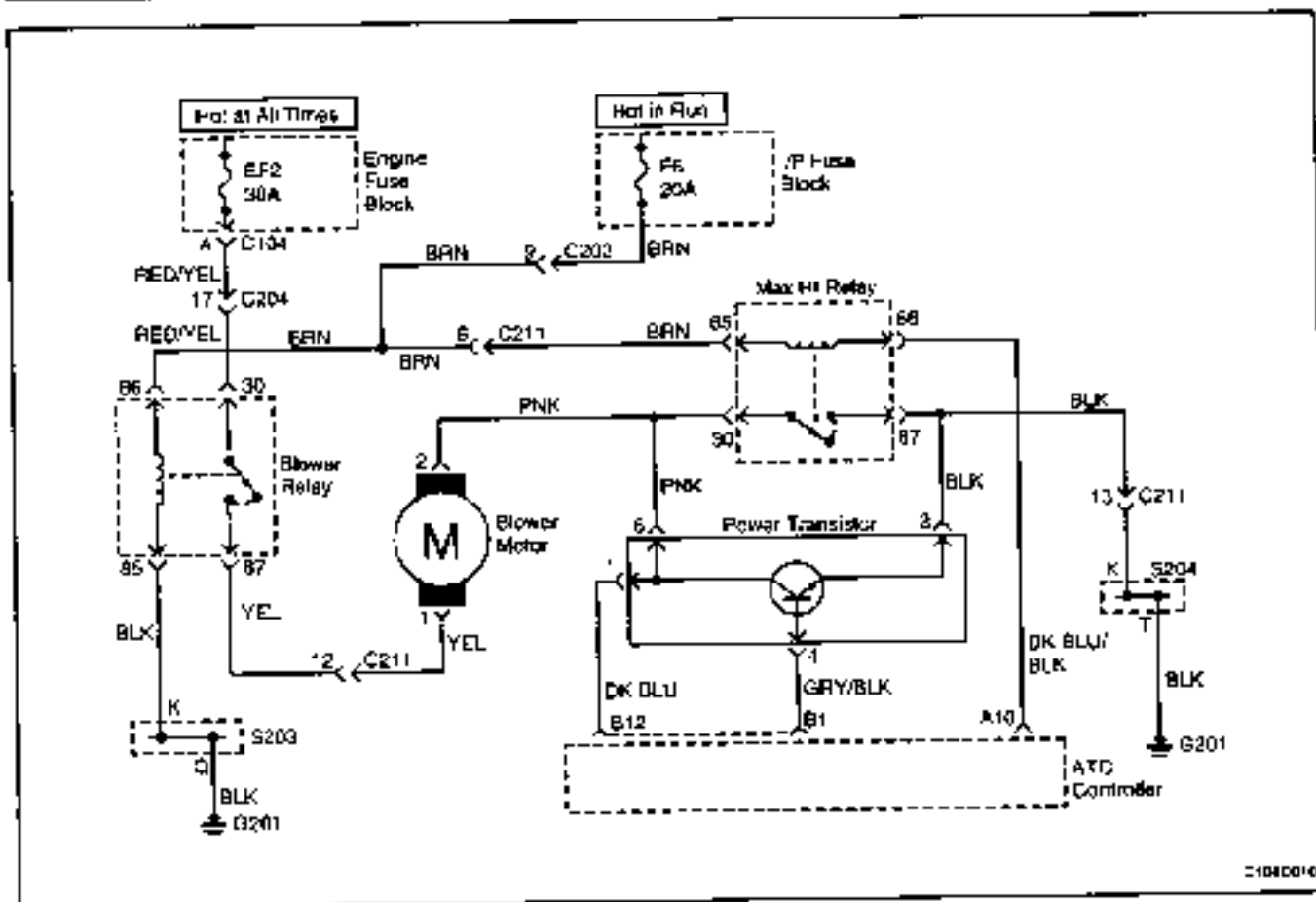
### CODE 6 - POWER TRANSISTOR ERROR

Step	Action	Value(s)	Yes	No
1	1. Disconnect the ATC controller connectors A and B. 2. Disconnect the connectors from the power transistor. 3. Measure the resistance circuit GRAY/BLK from terminal 4 of the power transistor to terminal B1 of the ATC controller. Does the resistance equal the specified value?	$\approx 0 \Omega$	Go to Step 2	Go to Step 6
2	Measure the resistance in the circuit from terminal 1 of the power module control unit to terminal B12 of the ATC controller. Does the resistance equal the specified value?	$\approx 0 \Omega$	Go to Step 3	Go to Step 6
3	1. Reconnect the wiring harness to the ATC controller and to the power module control unit. 2. Turn the ignition switch to ON. 3. Measure the voltage from ground to terminal B12 of the ATC controller. 4. Cycle the fan speed controller manually from the lowest (speed 1) to the highest speed (5). Do the voltages measured match approximately the specified values within $\pm 0.5$ v?	1: 8.8 v 2: 6.8 v 3: 4.4 v 4: 2.7 v 5: 0 v	Go to Step 4	Go to Step 5



## Code 6 - Power Transistor Error (Cont'd)

Step	Action	Value(s)	Yes	No
4	Replace the ATC controller Is the repair complete?	-	System OK	-
5	Measure the resistance in circuit PNK between terminal 6 of the power transistor and the blower motor terminal 2. Does the resistance equal the specified value?	- 0 $\Omega$	Go to Step 7	Go to Step 6
6	Repair or replace the wiring harness for circuit PNK. Is the repair complete?	-	System OK	-
7	Check the wiring harness of the motor and power supply. <ul style="list-style-type: none"> <li>• Check the blower relay</li> <li>• Check fuse EF2.</li> </ul> Is there any problem in the wiring, the relay, or the fuse?	-	Go to Step 9	Go to Step 8
8	Replace the power transistor Is the repair complete?	-	System OK	-
9	Repair or replace the wiring harness, the relay, or the fuse as required. Is the repair complete?	-	System OK	-



### CODE 7 - MAX-HI RELAY ERROR

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition switch ON. 2. Set the blower speed manually for 5th speed. 3. Measure voltage between the ATC controller terminal A10 and ground. Is the voltage approximately equal to the specified value?	~0 v	Go to Step 3	Go to Step 2
2	Replace the ATC controller. Is the repair complete?	-	System OK	-
3	1. Check the wiring harness associated with the MAX-HI relay for defects or high terminal resistance. 2. Repair any defects found. Is the repair complete?	-	System OK	Go to Step 4
4	Replace the MAX-HI relay. Is the repair complete?	-	System OK	-

## **MAINTENANCE AND REPAIR ON-VEHICLE SERVICE GENERAL A/C SYSTEM SERVICE PROCEDURES**

### **GENERAL SERVICE PROCEDURES**

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*, for details of the following procedures:

- Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System.
- Handling of Refrigerant Lines and Fittings.
- Handling Refrigerant.
- Maintaining Chemical Stability in the Refrigeration System.
- O-Ring Replacement.

## **SERVICEABLE COMPONENTS**

### **COMMON HVAC COMPONENTS**

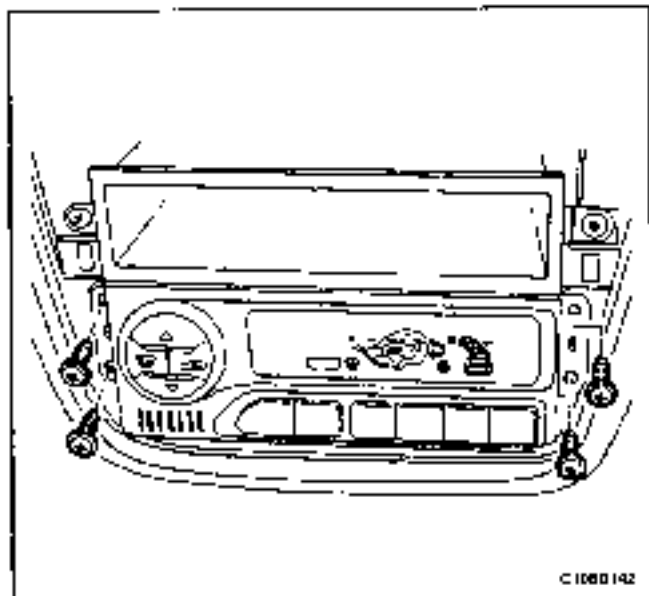
These components used in non-automatic systems are covered in other sections of this manual.

Refer to *Section 7A, Heating and Ventilation System* for the following procedures.

- Blower Motor.
- Heater Hoses.

Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System* for the following procedures:

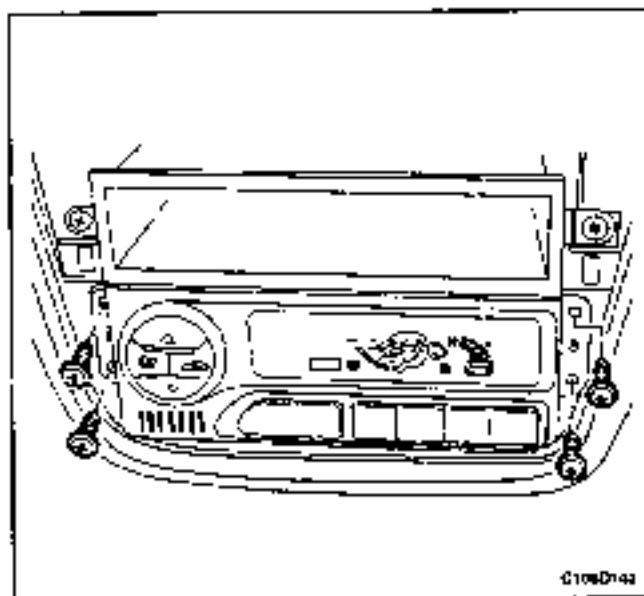
- A/C Pressure Transducer.
- Compressor-to-Condenser Hose.
- Compressor.
- Condenser.
- Evaporator-to-Compressor Pipe.
- Evaporator-to-Receiver-Dryer Pipe.
- Receiver-Dryer.



## AUTOMATIC TEMPERATURE CONTROL ASSEMBLY

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the audio trim panel. Refer to Section 9F, Audio Systems.
3. Remove the control assembly retaining screws.
4. Pull out the unit to gain access to the rear.
5. Disconnect the electrical connectors.
6. Remove the air inlet tube.
7. Remove the automatic temperature control assembly.



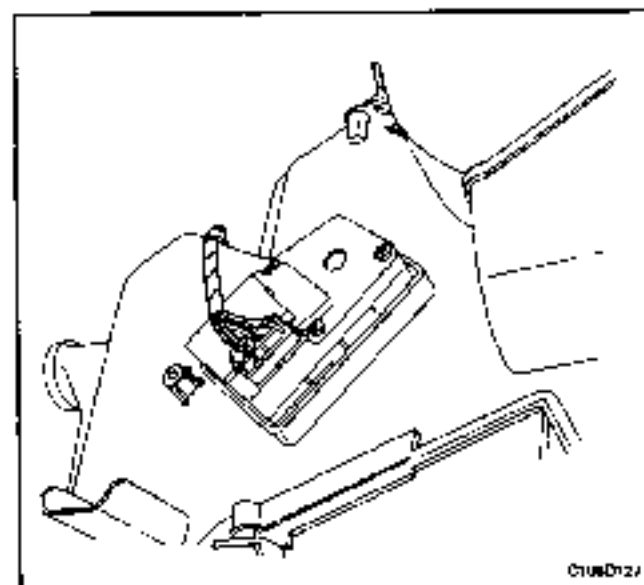
### Installation Procedure

1. Connect the air inlet tube.
2. Connect the electrical connectors.
3. Position the automatic temperature control assembly and install the retaining screws.

### Tighten

Tighten the control assembly retaining screws to 4 N•m (35 lb-in).

4. Install the audio trim panel. Refer to Section 9F, Audio Systems.
5. Connect the negative battery cable.

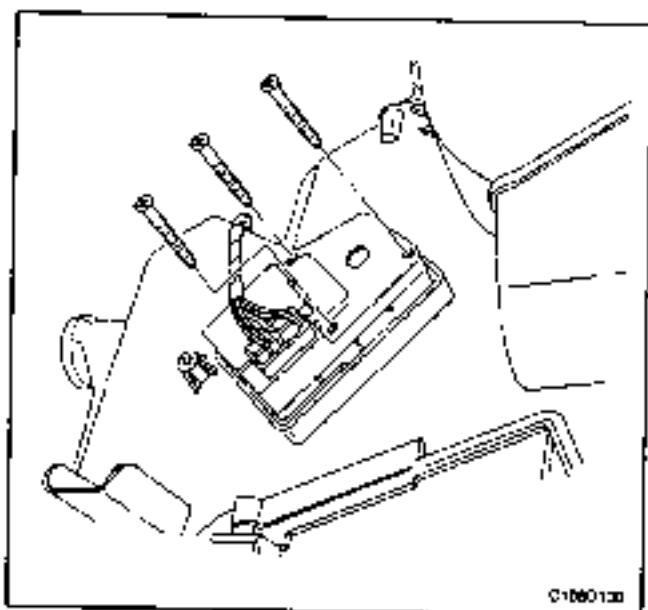


## AIR MIX DOOR MOTOR

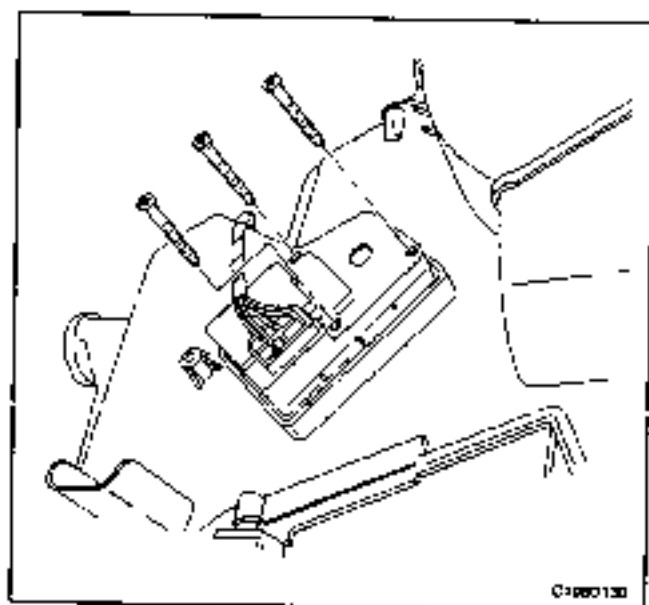
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector.

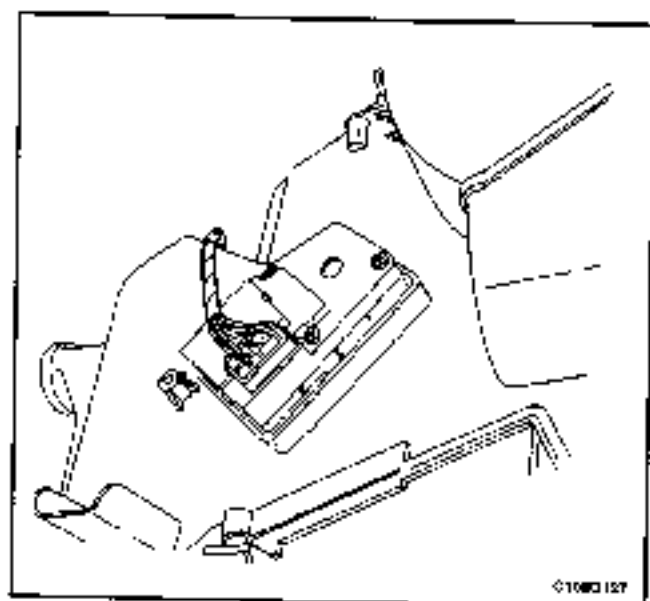


3. Remove the motor retaining bolts.
4. Slide the air mix door motor off the door shaft and remove the motor.

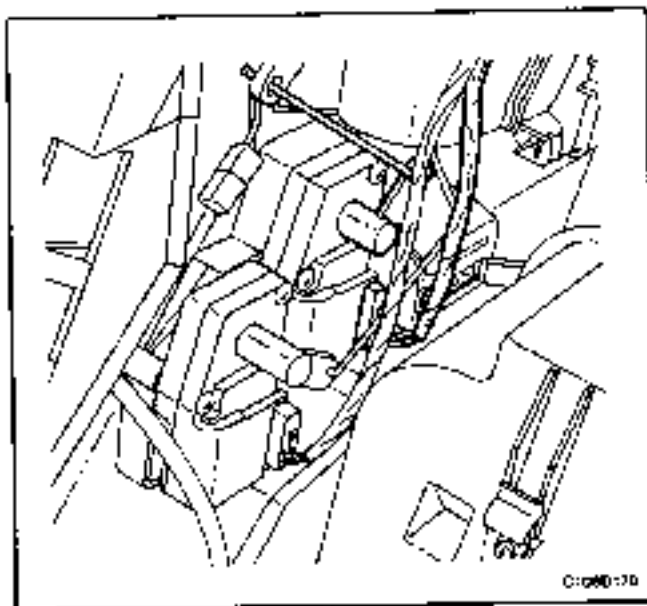


### Installation Procedure

1. Position the air mix door motor onto the door shaft.
2. Install the motor retaining bolts and tighten.



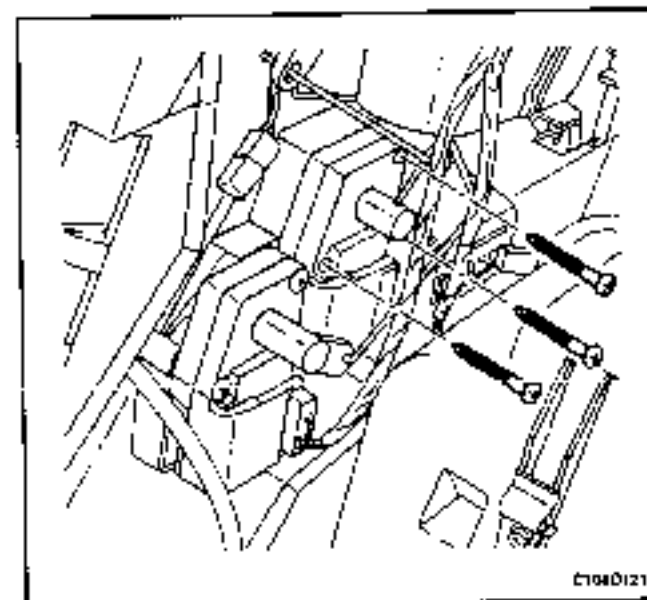
3. Connect the electrical connector.
4. Connect the negative battery cable.



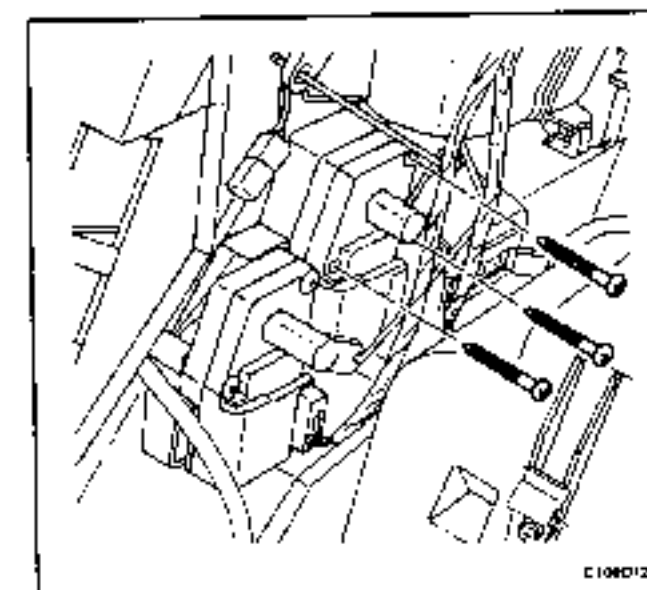
## HEATER/DEFROSTER DOOR MOTOR (Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
3. Disconnect the electrical connector.
4. Remove the actuating rod by snapping it out of the lever with needle-nose pliers.

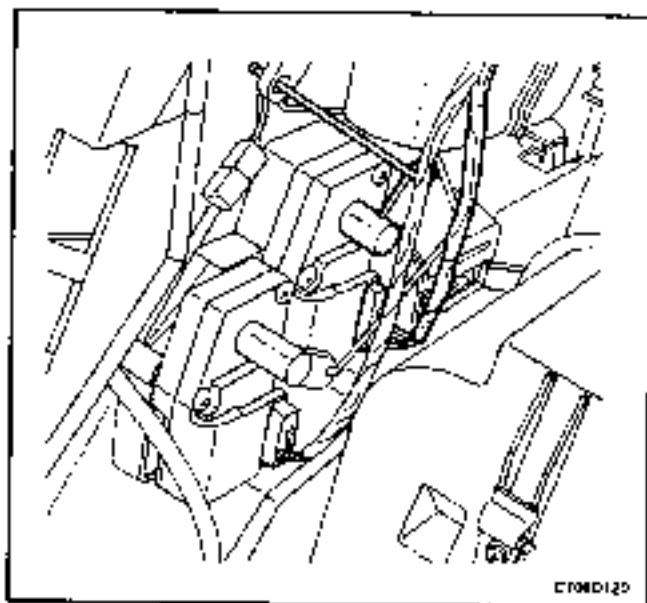


5. Remove the motor lever from its shaft by pulling the lever off.
6. Remove the motor retaining bolts.
7. Remove the heater/defroster door motor.

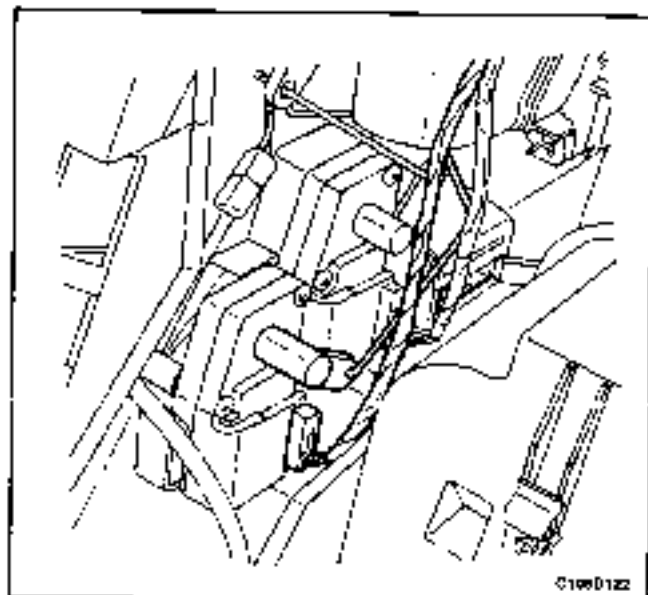


### Installation Procedure

1. Install the heater/defroster door motor.
2. Install the retaining bolt and tighten.



- 3 Press the lever onto the motor shaft.
- 4 Install the actuating rod onto the lever.
- 5 Connect the electrical connector.
- 6 Install the heater/air distributor case assembly. Refer to "Heater Air/Distributor Case Assembly" in this section.
- 7 Connect the negative battery cable.

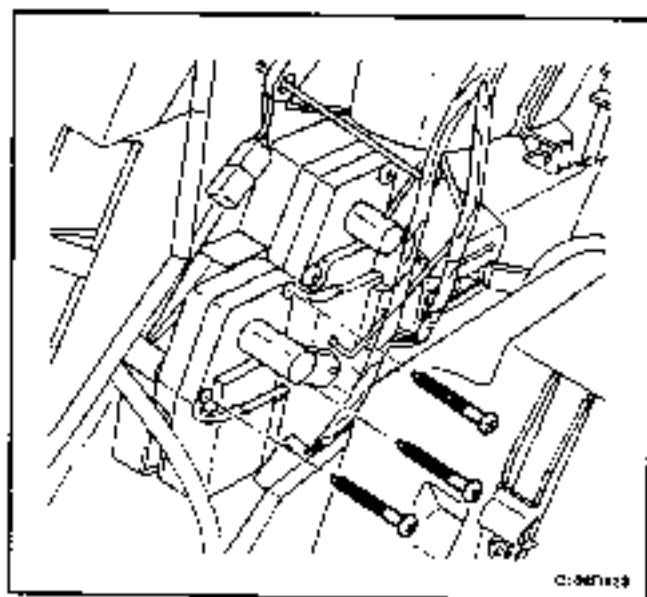


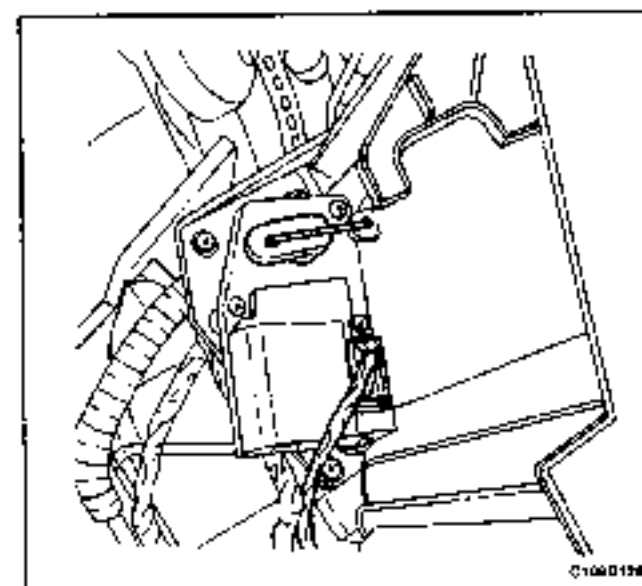
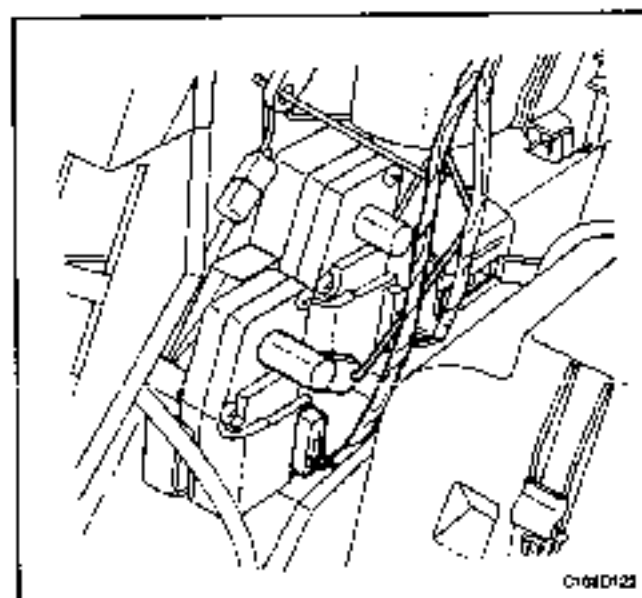
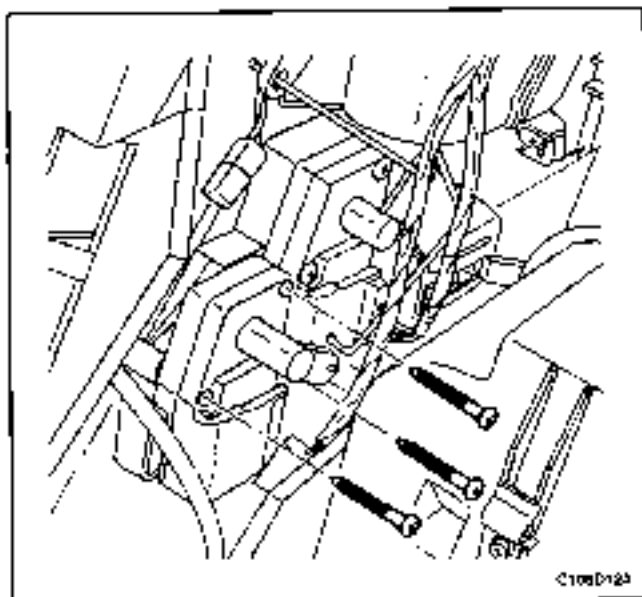
### MODE DOOR MOTOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

- 1 Disconnect the negative battery cable.
- 2 Remove the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
- 3 Disconnect the electrical connector.
- 4 Remove the motor actuating rod by snapping it out of the lever with needle-nose pliers.
- 5 Remove the motor lever.
- 6 Remove the motor retaining bolts.
- 7 Remove the mode door motor.





### Installation Procedure

1. Install the mode door motor.
2. Install the motor retaining bolts and tighten.
3. Install the motor lever by pressing it onto its shaft.
4. Install the actuating rod.
5. Connect the electrical connector.
6. Install the heater/air distributor case. Refer to "Heater/Air Distributor Case Assembly" in this section.
7. Connect the negative battery cable.

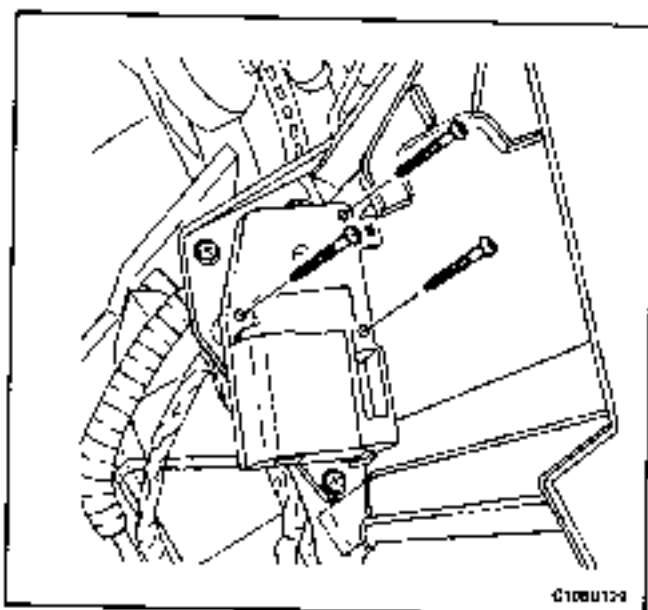
### INLET AIR DOOR MOTOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

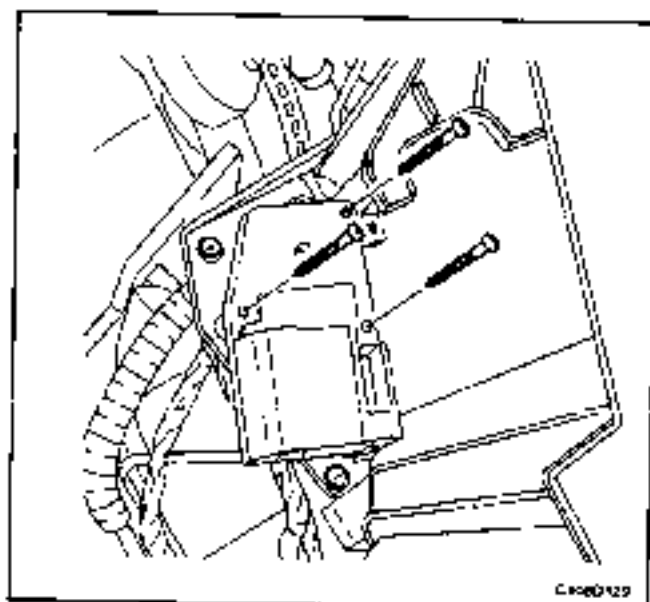
#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Remove the actuating rod by snapping the rod out of the lever with needle-nose pliers.
4. Remove the actuating lever.
5. Disconnect the electrical connector.



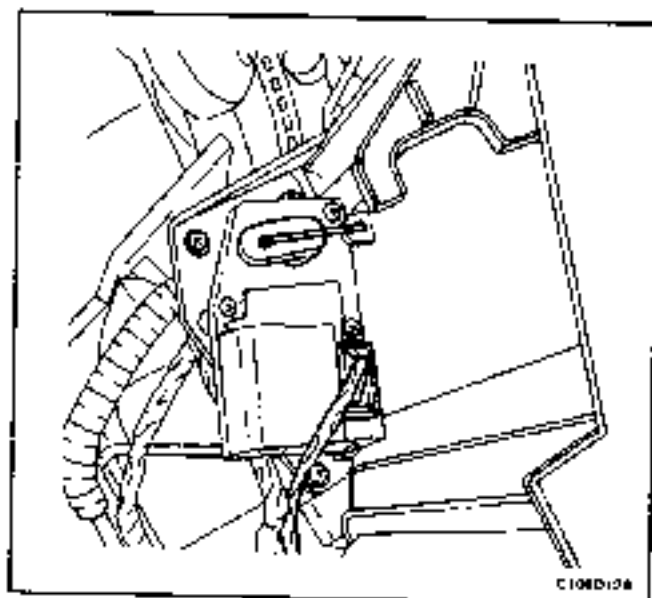


6. Remove the motor retaining bolts.
7. Remove the motor.

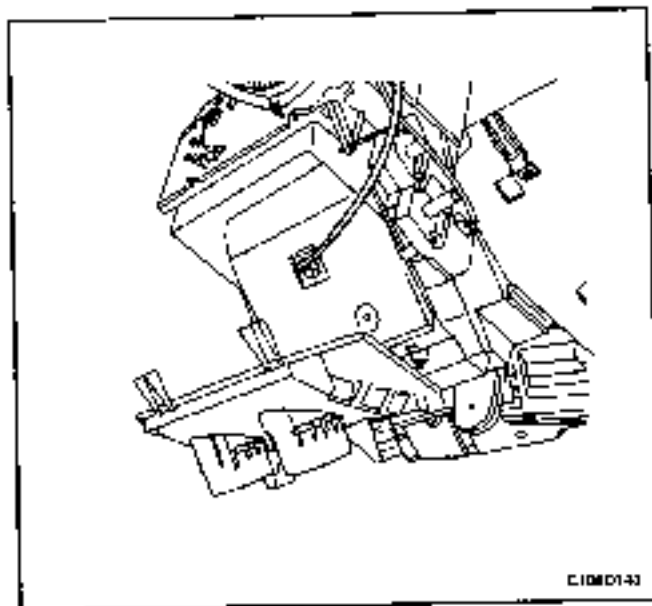


### Installation Procedure

1. Install the motor.
2. Install the motor retaining bolts and tighten.



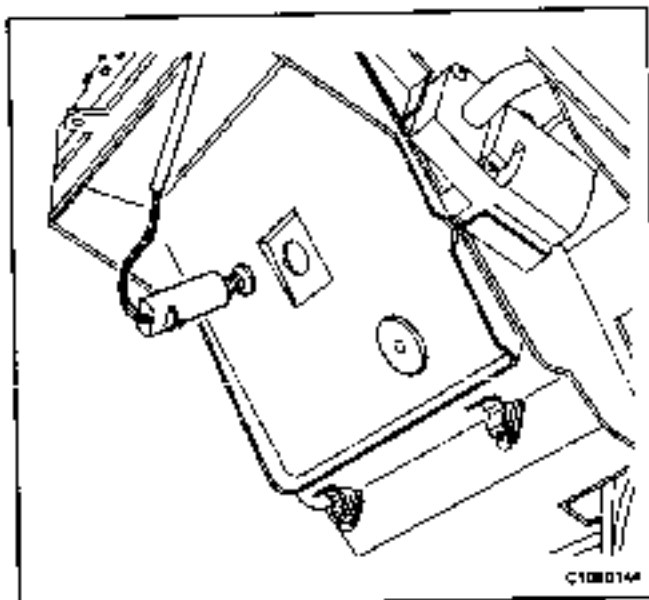
3. Install the actuating lever.
4. Install the actuating rod.
5. Connect the electrical connector.
6. Install the glove box. Refer to Section 9E, Instrumentation/Driver Information.
7. Connect the negative battery cable.



## COOLANT TEMPERATURE SENSOR (Left-Hand Drive Shown, Right-Hand Drive Similar)

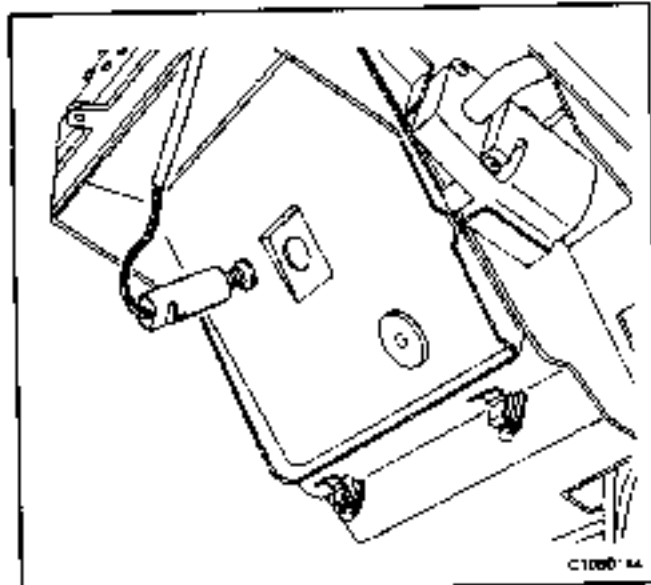
### Removal Procedure

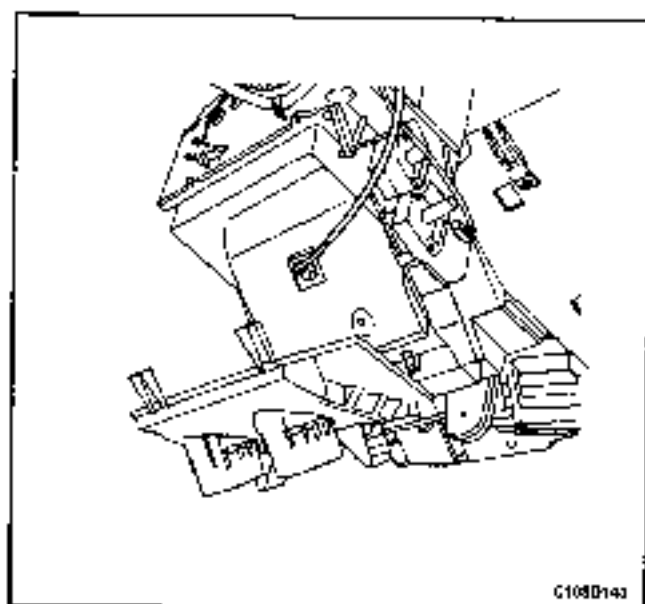
1. Disconnect the negative battery cable.
2. Remove the audio system and the center tray. Refer to Section 9F, *Audio Systems*.
3. Remove the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
4. Remove the heater/air distributor case assembly lower cover screws.
5. Remove the heater/air distributor case assembly lower cover to gain access to the coolant temperature sensor.
6. Turn the sensor to release it from the heater/air distributor case housing.
7. Disconnect the electrical connector.



### Installation Procedure

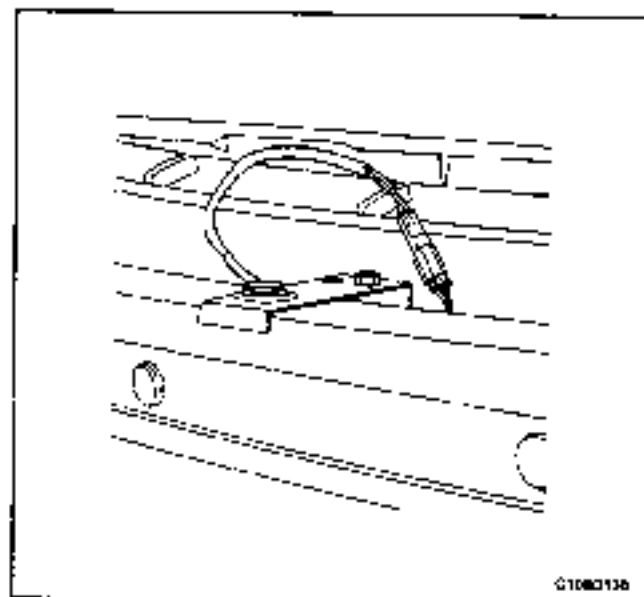
1. Install the coolant temperature sensor into the heater/air distributor case housing and turn the sensor to lock it.
2. Connect the electrical connector.





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3. Install the heater/air distributor case assembly lower cover into position.
4. Install the heater/air distributor case assembly lower cover retaining screws and tighten.
5. Install the audio system and the center tray. Refer to Section 9F, *Audio Systems*.
6. Install the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
7. Connect the negative battery cable.

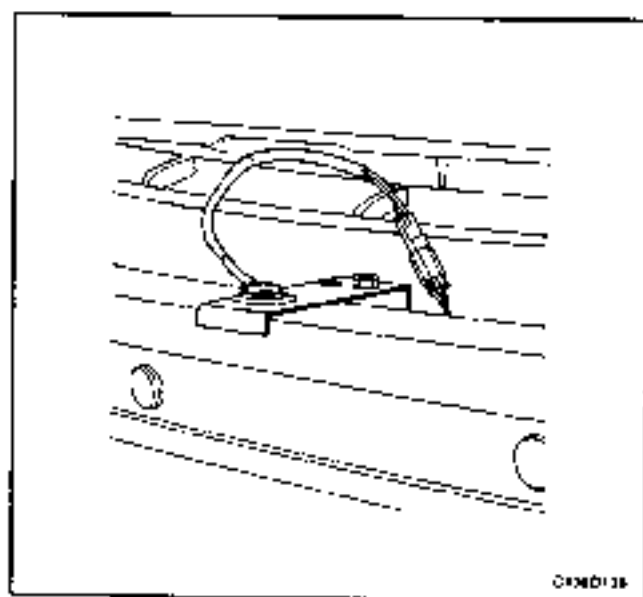


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## AMBIENT AIR TEMPERATURE SENSOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the ambient air temperature sensor electrical connector.
3. Remove the retaining nut from the bracket.
4. Remove the ambient air temperature sensor.



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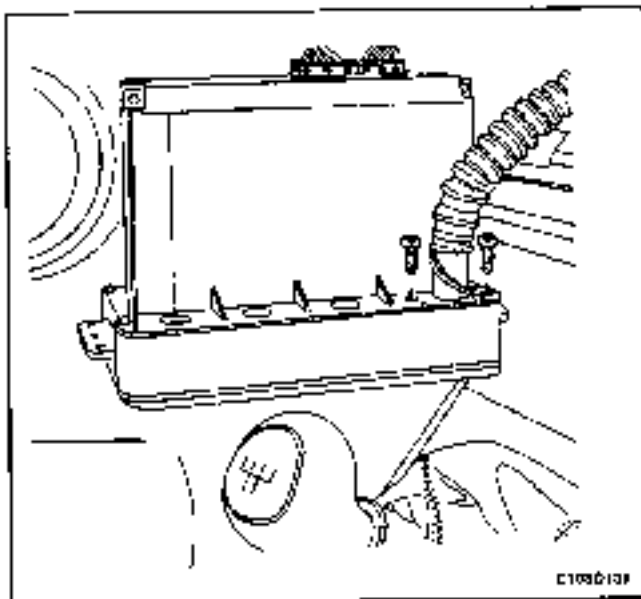
### Installation Procedure

1. Position the ambient air temperature sensor into its bracket.
2. Install the retaining nut to the bracket.

### Tighten

Tighten the ambient air temperature retaining bracket nut to 6 N•m (53 lb-in).

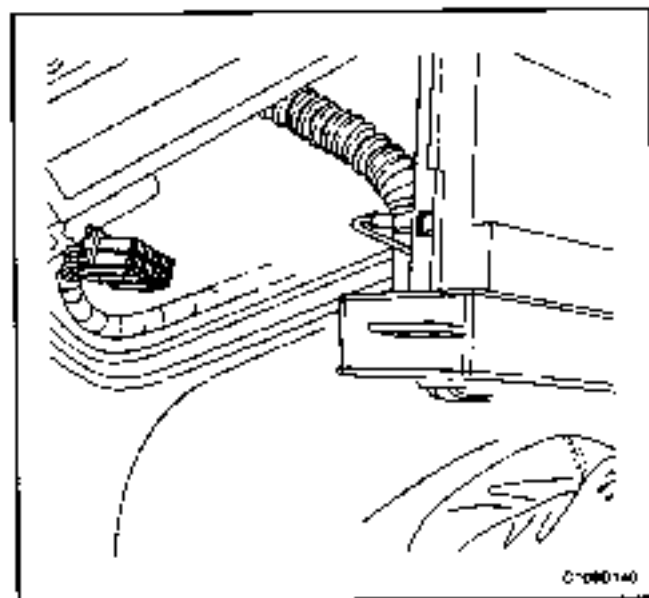
3. Connect the electrical connector.
4. Connect the negative battery cable.



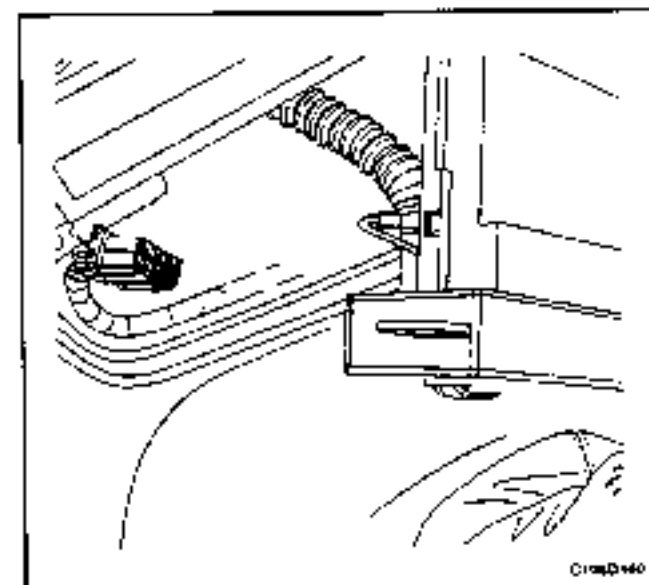
## IN-CAR TEMPERATURE SENSOR

### Removal Procedure

1. Disconnect the negative battery cable
2. Remove the automatic temperature control assembly. Refer to "Automatic Temperature Control Assembly" in this section.
3. Remove the screws securing the in-car temperature sensor

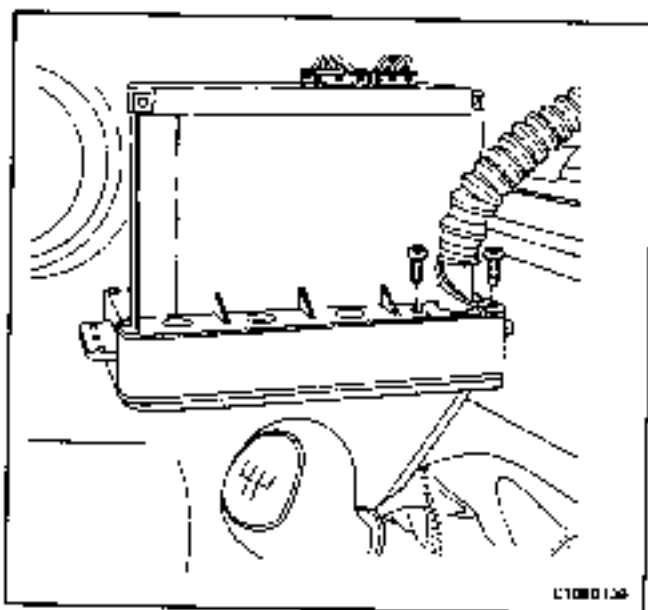


4. Disconnect the electrical connector and remove the air inlet tube
5. Remove the in-car temperature sensor from the controller.

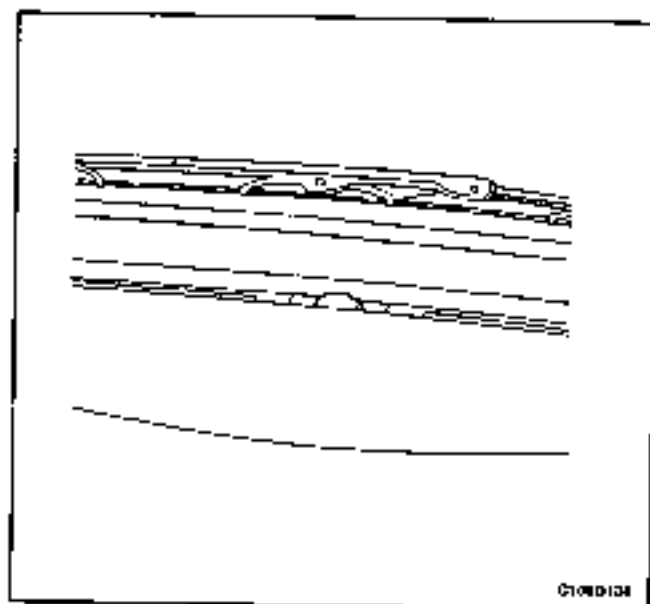


### Installation Procedure

1. Install the in-car temperature sensor into the controller.



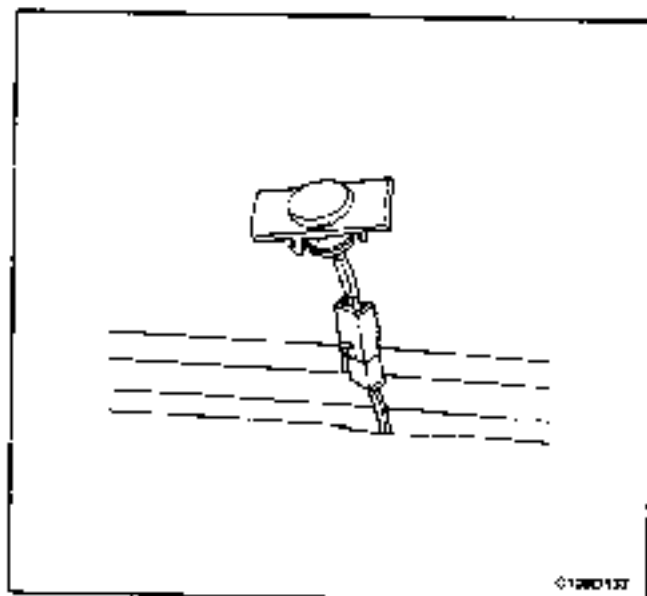
2. Install the in-car sensor retaining screws and tighten.
3. Install the air inlet tube and connect the electrical connector.
4. Install the automatic temperature control assembly. Refer to "Automatic Temperature Control Assembly" in this section.
5. Connect the battery negative cable.



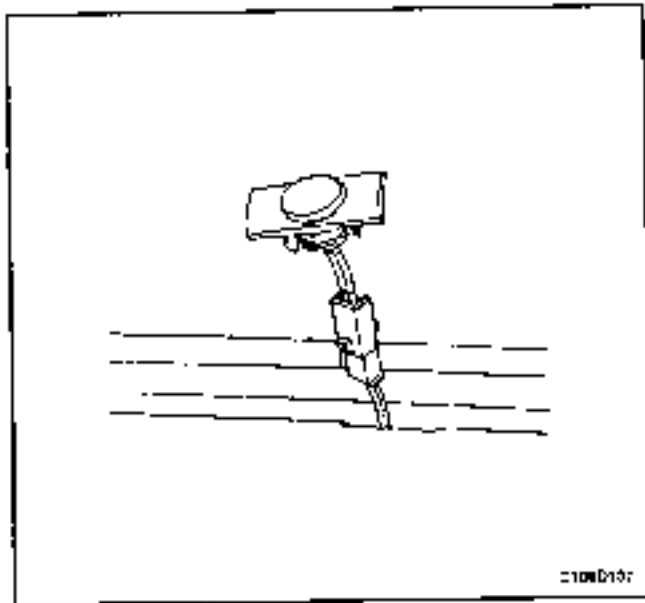
## SUN SENSOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Gently pry up on the sun sensor to remove it.

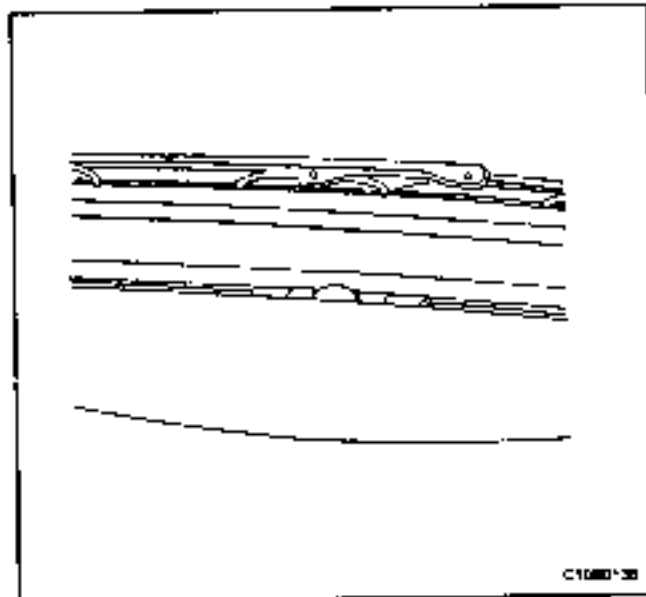


3. Secure the electrical connector to prevent it from falling beneath the dash.
4. Disconnect the electrical connector.

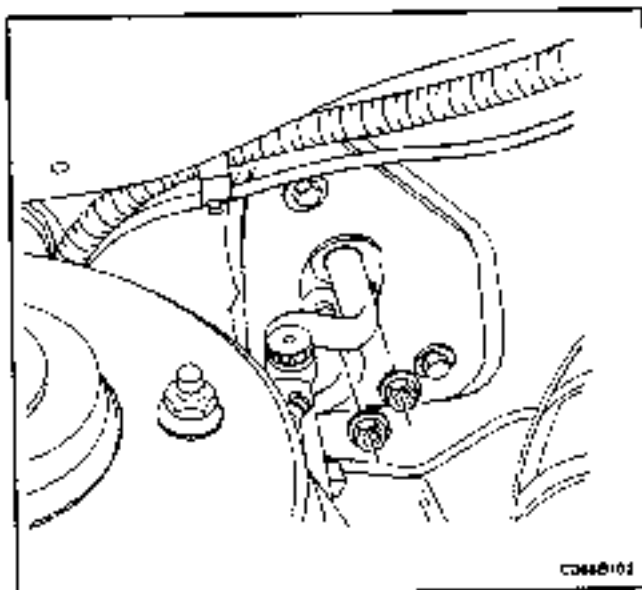


### Installation Procedure

1. Connect the electrical connector.



2. Insert and press the sun sensor into position in the dash.
3. Connect the negative battery cable.

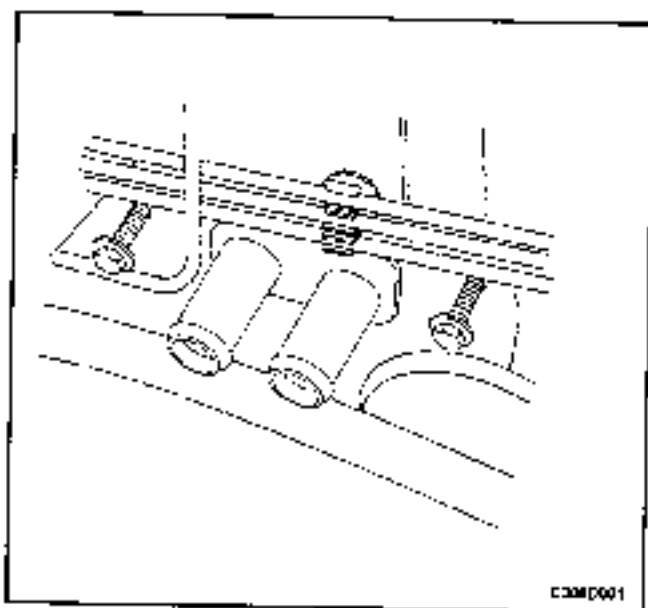


### HEATER/AIR DISTRIBUTOR CASE ASSEMBLY

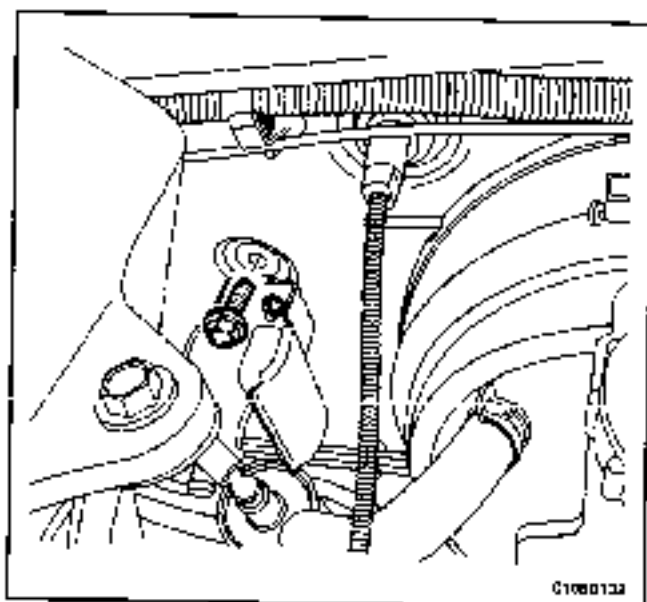
(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

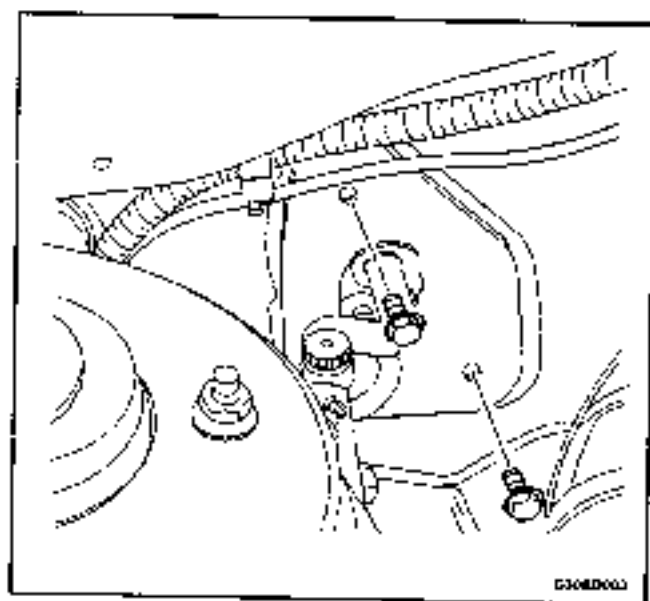
1. Disconnect the negative battery cable.
2. Remove the instrument panel carrier assembly. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Drain the cooling system. Refer to Section 1D, *Engine Cooling*.
4. Recover the refrigerant. Refer to Section 7B, *Manual Control Heating, Ventilation, and Air Conditioning System*.
5. Remove the retaining nuts that secure the suction hose and the liquid evaporator pipe blocks at the fire wall.



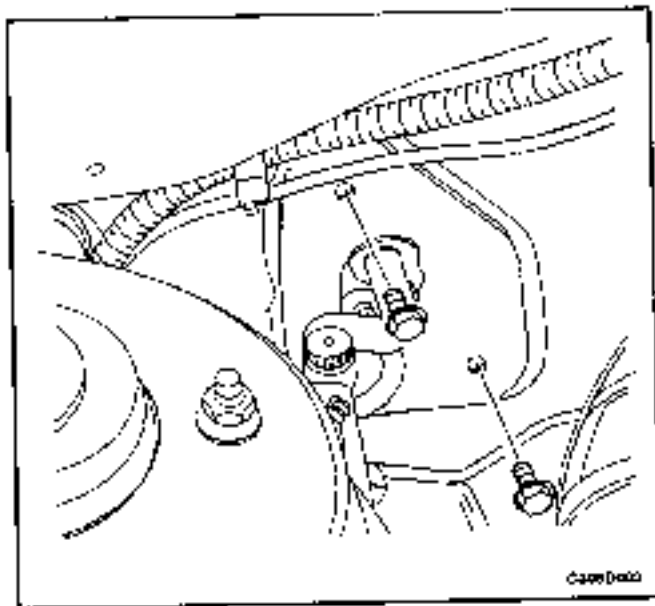
6. Loosen the clamp bolts from the suction hose and the liquid evaporator pipe to allow movement of the hose and the pipe.
7. Remove the evaporator drain hose.
8. Compress the heater hose clamps at the fire wall and slide the clamps toward the engine.
9. Remove the two heater hoses from the core lines at the fire wall.
10. Remove the screws that secure the heater/air distributor case assembly to the fire wall on either side of the heater hoses.



11. Remove the heater/air distributor case screw, that is located above the 1/2" filter, from the engine compartment side of the fire wall.
12. Have an assistant support the heater/air distributor case from inside the vehicle.



13. Remove the heater/air distributor case screws from the evaporator flange on the engine compartment side of the fire wall. The heater/air distributor case assembly will start to drop.
14. Pull the case straight away from the fire wall.
15. Remove the heater/air distributor case assembly from the vehicle.



### Installation Procedure

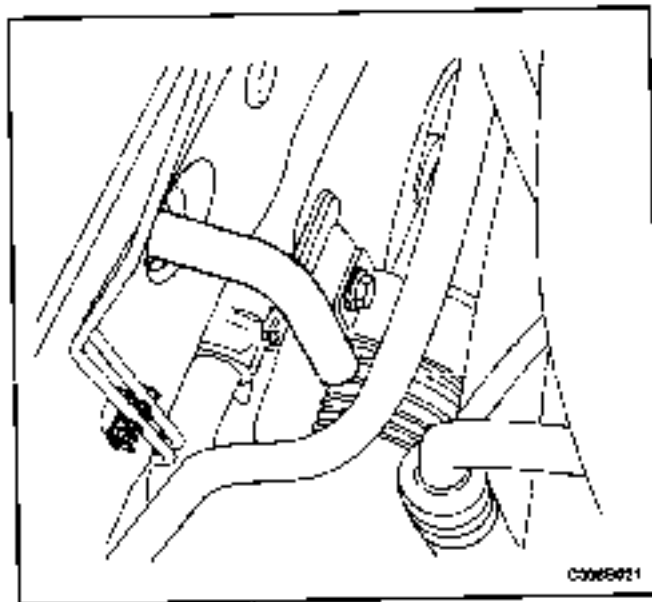
1. Position the heater/air distributor case assembly in the vehicle.

**Notice:** To avoid damaging the heater core tubes, make sure they do not contact the fire wall opening.

2. Slowly raise the heater/air distributor case assembly into position and hold it against the fire wall while the screws are installed and tightened from the engine side of the fire wall.
3. Align and install the heater/air distributor case assembly screws above the fuel filter and at the evaporator flange.

### Tighten

Tighten the heater/air distributor case assembly screws to 8 N·m (71 lb-in).

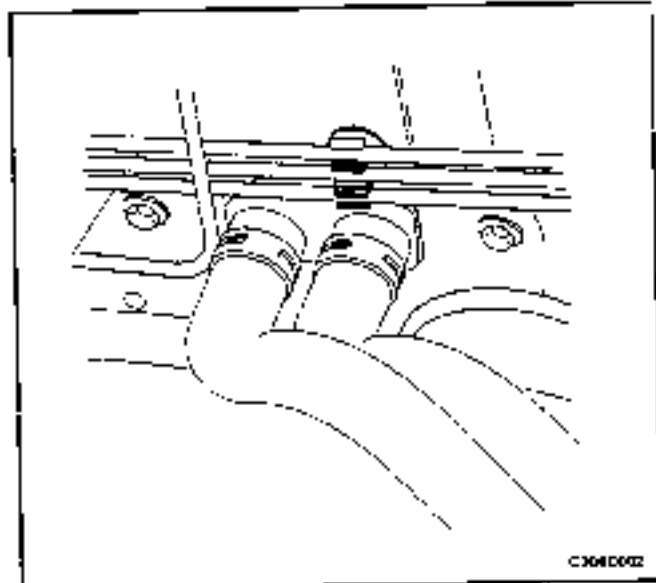


4. Install the heater/air distributor case assembly screws adjacent to the heater hoses.

### Tighten

Tighten the heater/air distributor case assembly screws to 8 N·m (71 lb-in).

5. Install the evaporator drain hose.

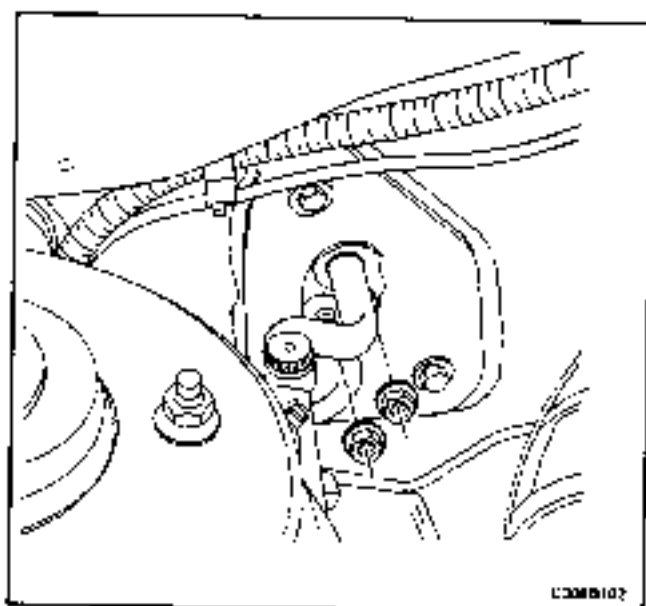


6. Install the two heater hoses.

7. Slide the heater hose clamps into position.

8. Install the instrument panel carrier assembly. Refer to Section 9E, Instrumentation/Driver Information.



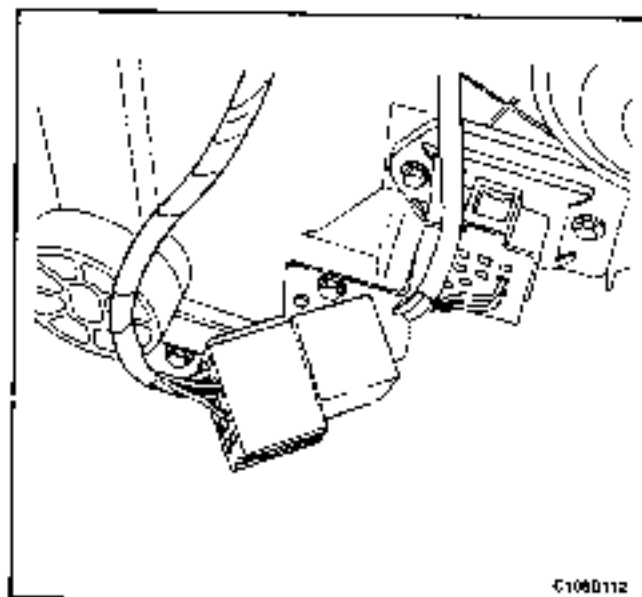


9. Install new O-rings on the suction hose and the liquid evaporator pipe at the fire wall and put the pipes back in place.
10. Install the retaining nuts that secure the suction hose and the liquid evaporator pipe blocks at the fire wall.

#### Tighten

Tighten the suction hose and the liquid evaporator pipe retaining nuts to 10 N·m (89 lb-in).

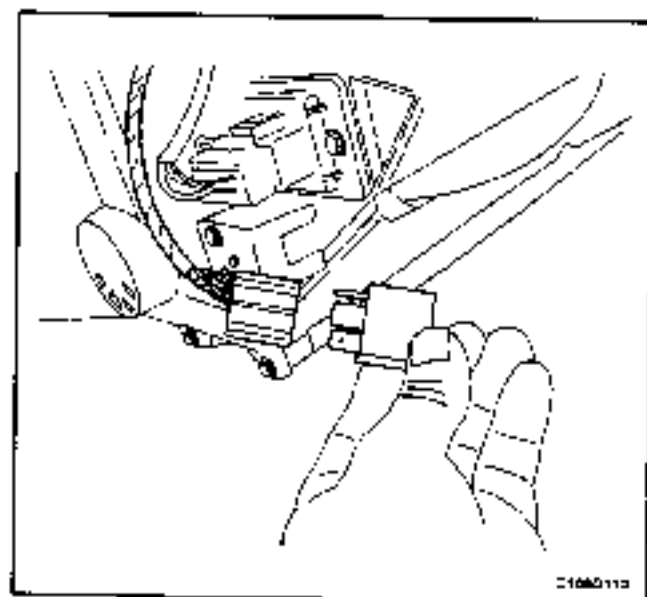
11. Fill the cooling system. Refer to *Section 10, Engine Cooling*.
12. Recharge the A/C system. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
13. Connect the negative battery cable.



### HIGH-BLOWER RELAY

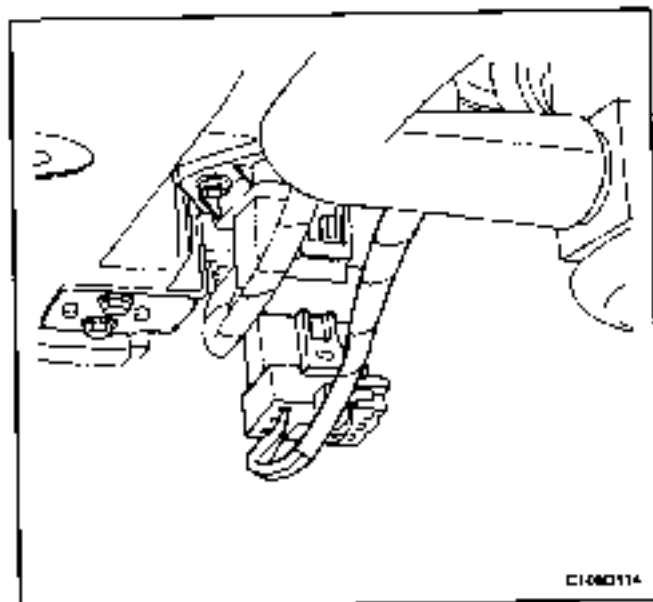
#### Removal Procedure

1. Disconnect the negative battery cable.
2. The relay is located in front of the blower motor.
3. Slide the relay and the connector up and out of its retaining track.
4. Separate the relay from the connector.



#### Installation Procedure

1. Align the high-blower relay contacts with the high-blower relay terminal slots.
2. Push the relay firmly into the base. The relay must be seated and flush with the edge of the base.
3. Connect the negative battery cable.



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## POWER TRANSISTOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove the footwell upper cover. Refer to *Section 9E, Instrumentation/Driver Information*.
4. Disconnect the electrical connector at the resistor.
5. Remove the screws from the resistor.
6. Remove the resistor from the heater/air distributor case assembly by gently pulling the resistor downward.

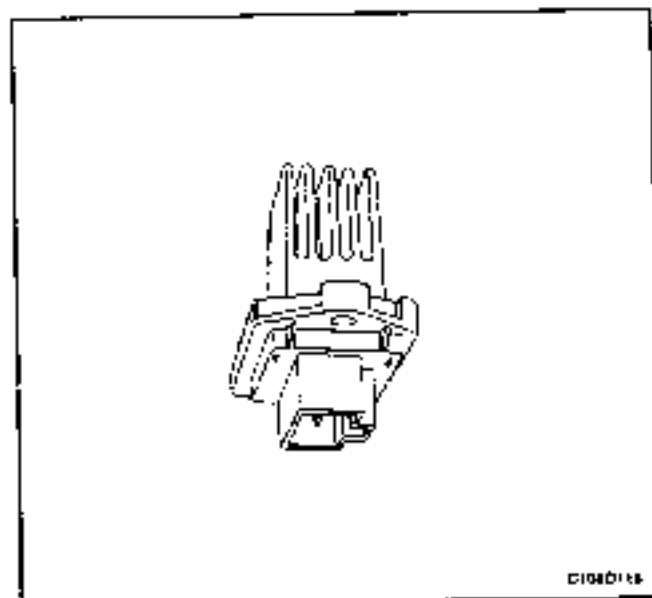
### Installation Procedure

1. Install the new resistor into the heater/air distributor case assembly with the screws.

#### Tighten

Tighten the blower motor resistor screws to 6 N•m (53 lb-in).

2. Connect the electrical connector at the resistor.
3. Connect the negative battery cable.
4. Confirm the proper performance of the blower.
5. Replace the footwell upper cover. Refer to *Section 9E, Instrumentation/Driver Information*.
6. Replace the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.



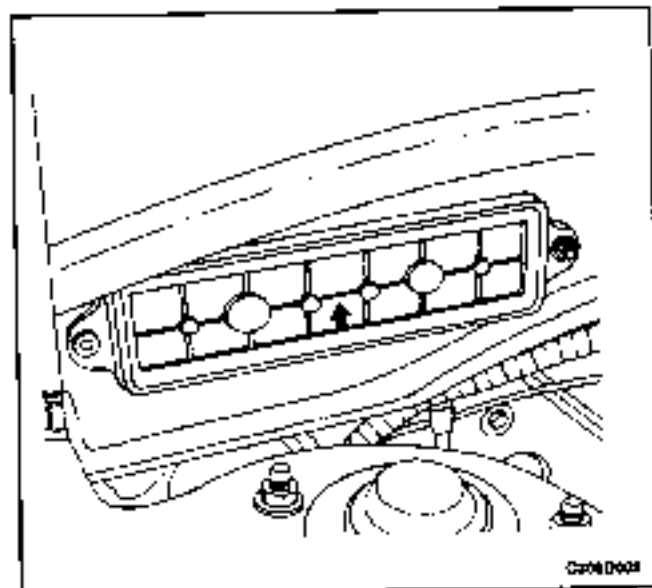
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## AIR FILTER

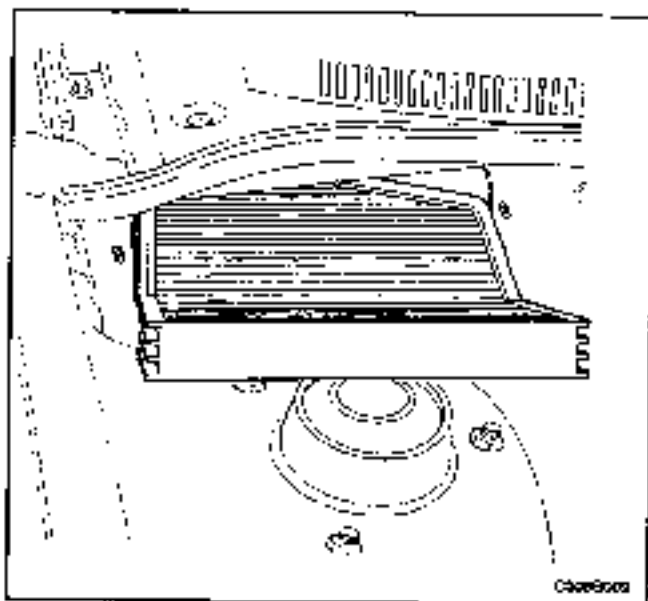
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

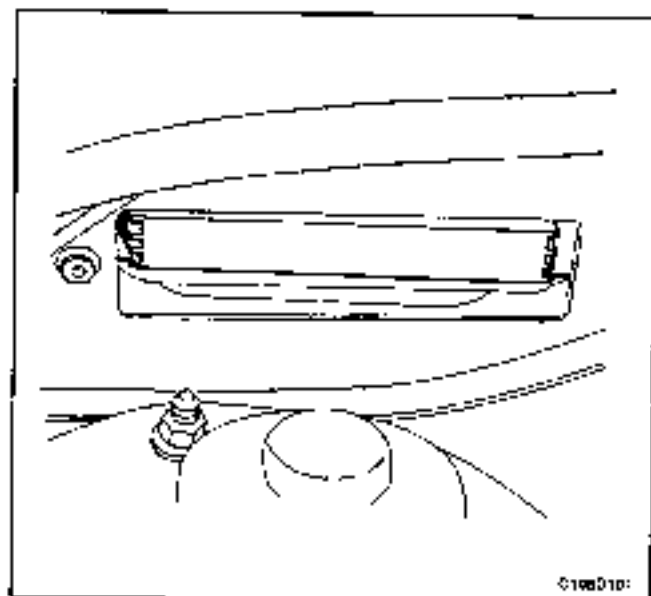
1. Remove the nut that secures the air filter cover to the fire wall.
2. Remove the cover.



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3. Pull the air filter out of the cavity in the fire wall.

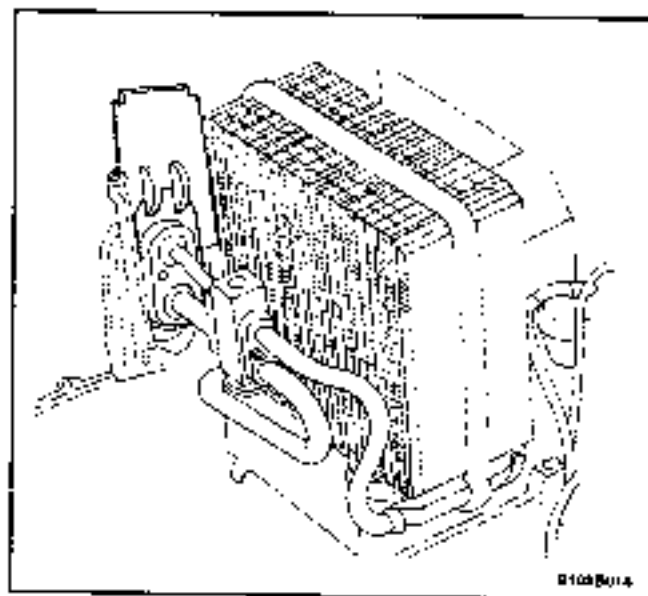


### Installation Procedure

1. Install the air filter into its cavity in the fire wall.
  - ◆ Align the fins on the plastic frame of the filter with the groove in the holder before attempting to insert the filter into place.
2. Install the air filter cover with the arrow pointing up.
3. Install the nut to secure the air filter cover to the fire wall.

### Tighten

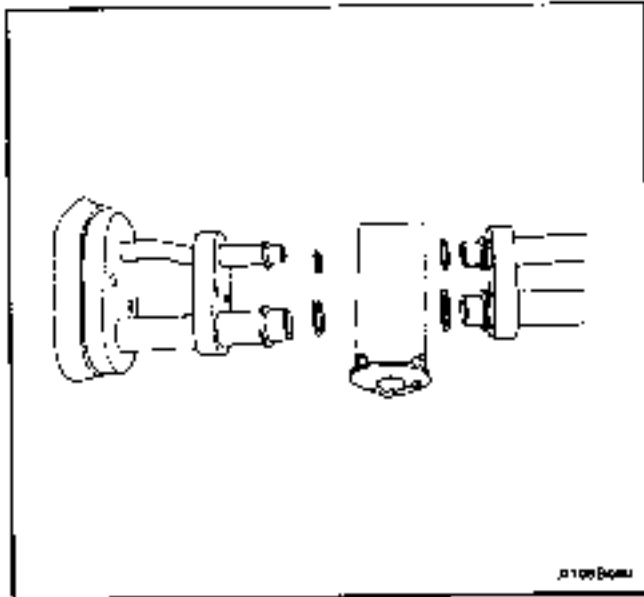
Tighten the air filter cover nut to 4 N•m (35 lb-in).



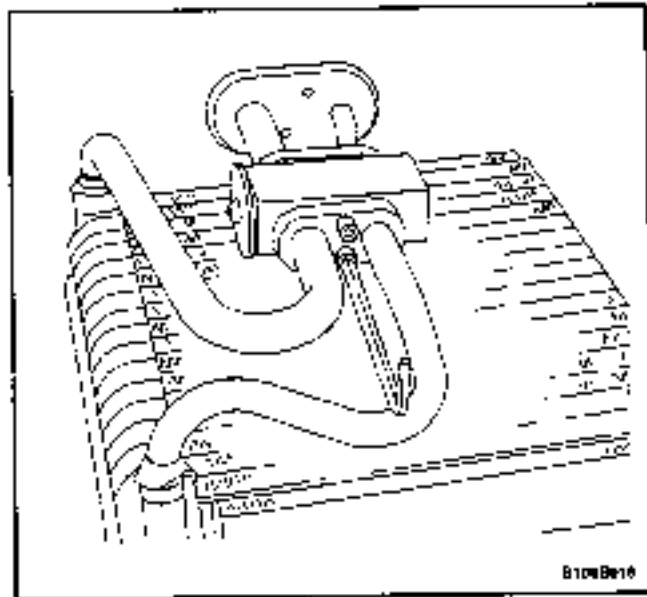
### A/C EXPANSION VALVE (Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

1. Remove the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.
2. Remove the screws securing the evaporator case halves.
3. Remove the evaporator core case cover.
4. Slide the evaporator flange support plate upward to facilitate evaporator removal.



5. Remove the evaporator from the case.
6. Remove the expansion valve bolts.
7. Remove the expansion valve.
8. Remove the O-rings from the evaporator lines and the A/C lines.

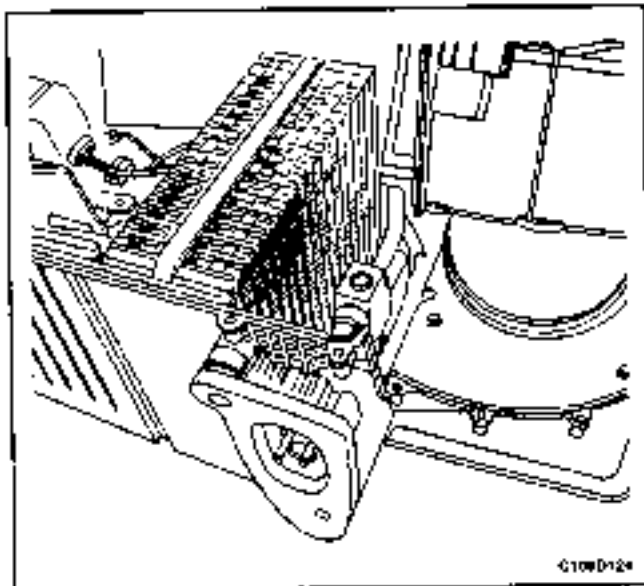


### Installation Procedure

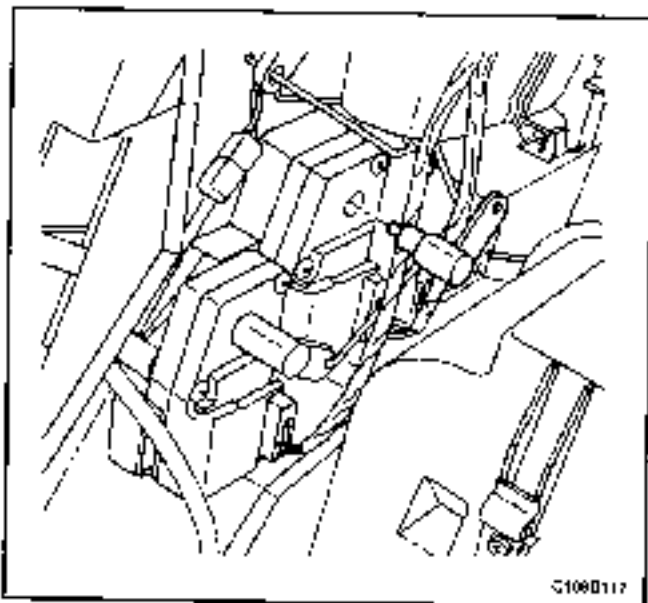
1. Clean the O-ring surface areas of dirt or contamination.
2. Install new O-rings on the evaporator lines and the A/C lines.
3. Install a new expansion valve onto the evaporator lines.
4. Insert the expansion valve bolts through the expansion valve into the mount surface of the evaporator flange.

### Tighten

Tighten the expansion valve bolts to 10 N•m (89 lb•in)



5. Install the evaporator core into the case. Center the evaporator flange in the case opening.
6. Install the evaporator core case cover with the screws.
7. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.

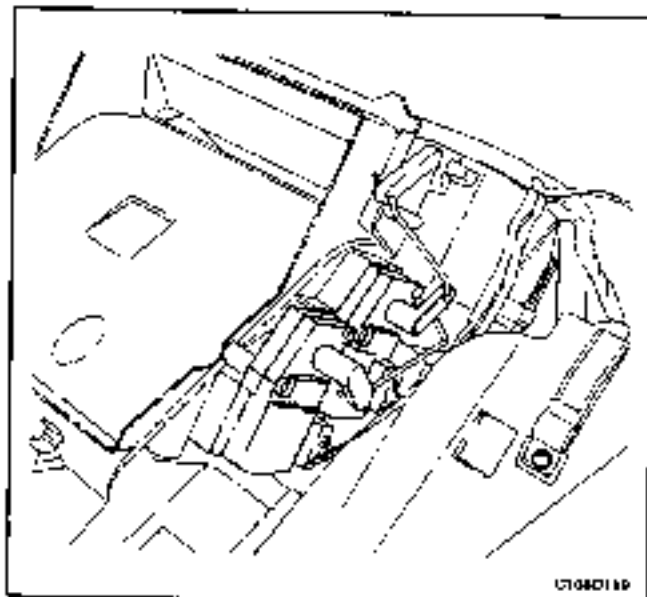


## HEATER CORE

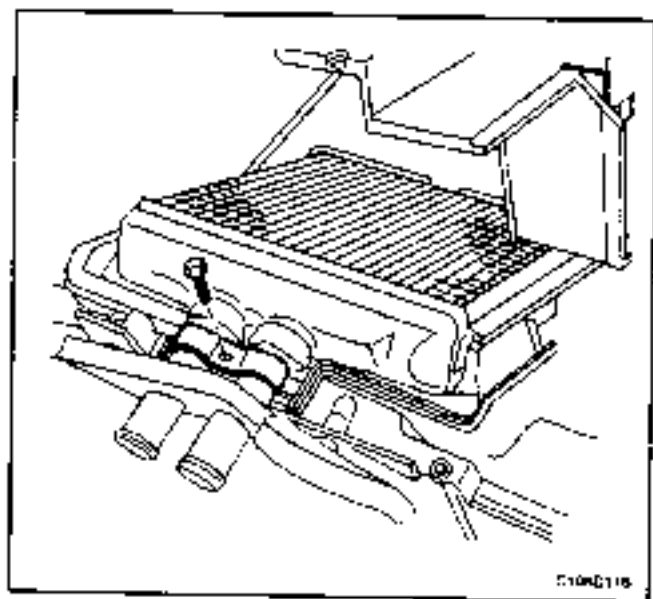
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

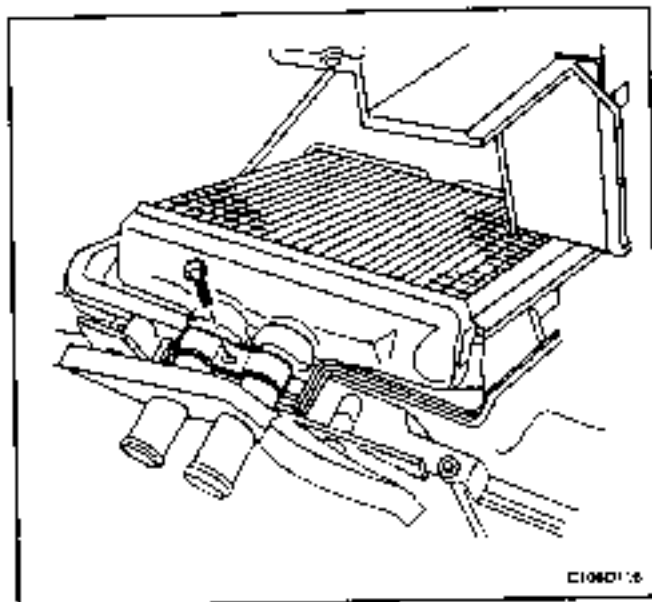
1. Remove the heater/air distributor case assembly from the vehicle. Refer to "Heater/Air Distributor Case Assembly" in this section.
2. Remove the motor lever and actuator rod.



3. Remove the motor screws and the motor to access a buried heater core cover bolt.
4. Remove the foam insulation from the tube base.
5. Remove the remaining actuator rod from the motor lever.
6. Remove the remaining screws that secure the heater core cover to the heater/air distributor case assembly.
7. Slowly separate the lower heater core cover from the rest of the assembly.

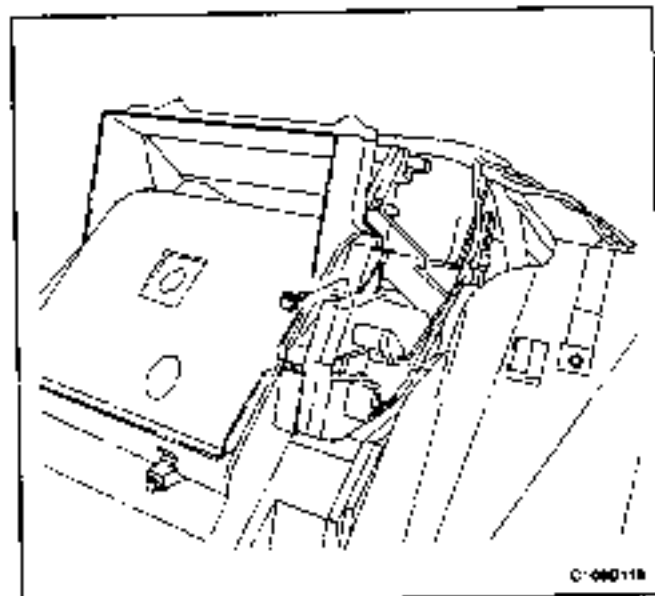


8. Remove the screw and the bracket clamp that secure the heater core lines to the case.
9. Remove the spring clamp that secures the heater core body to the case.
10. Remove the heater core from the case.

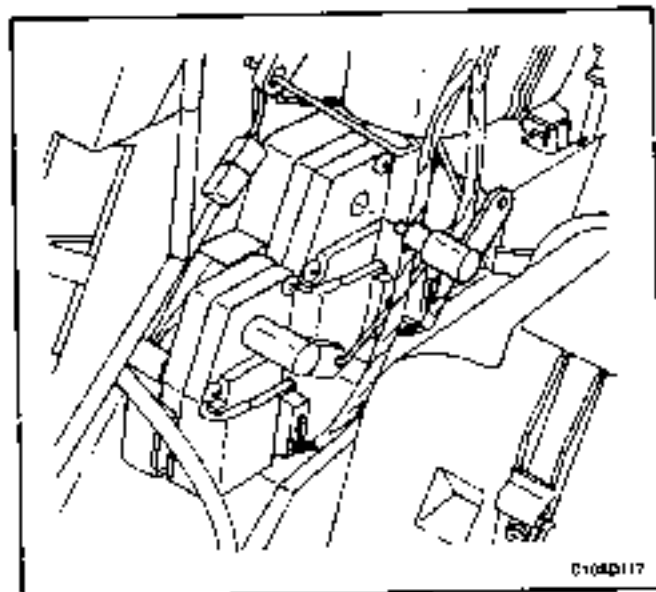


### Installation Procedure

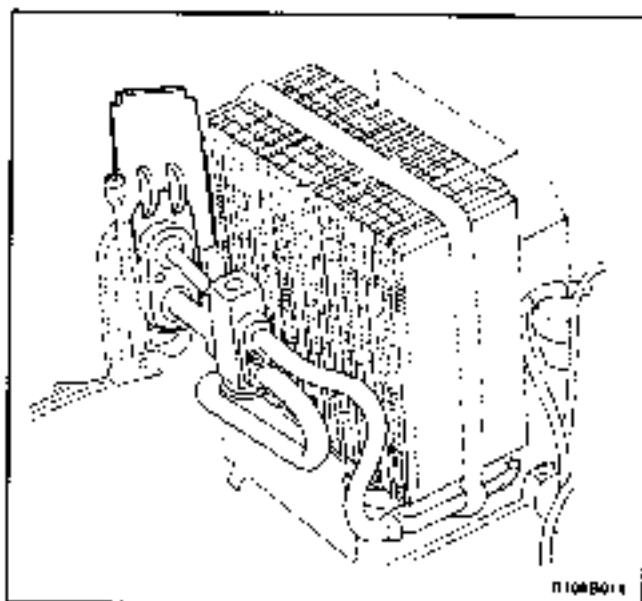
1. Install the heater core into the case.
2. Secure the heater core lines to the case with the retaining bracket clamp and the screw.



3. Install the heater core cover.
4. Install and tighten the screws that secure the heater core cover to the heater/air distributor case assembly.



5. Install the motor and screws for the floor diverter.
6. Install the heater/air distributor case. Refer to "Heater/Air Distributor Case Assembly" in this section.

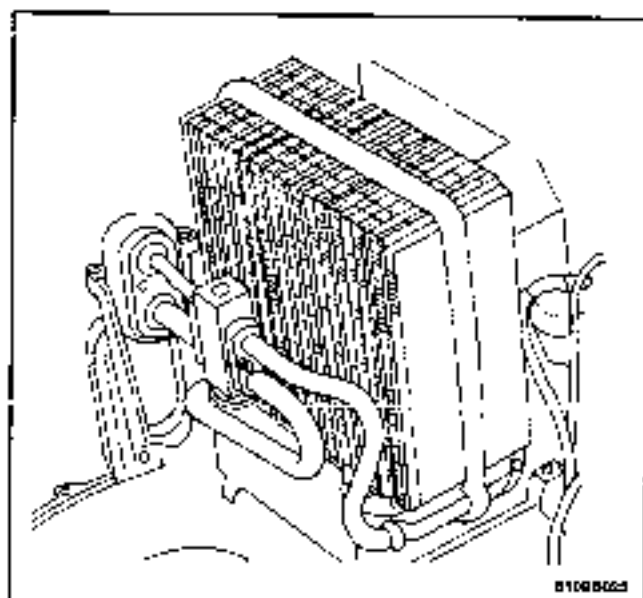


## EVAPORATOR CORE

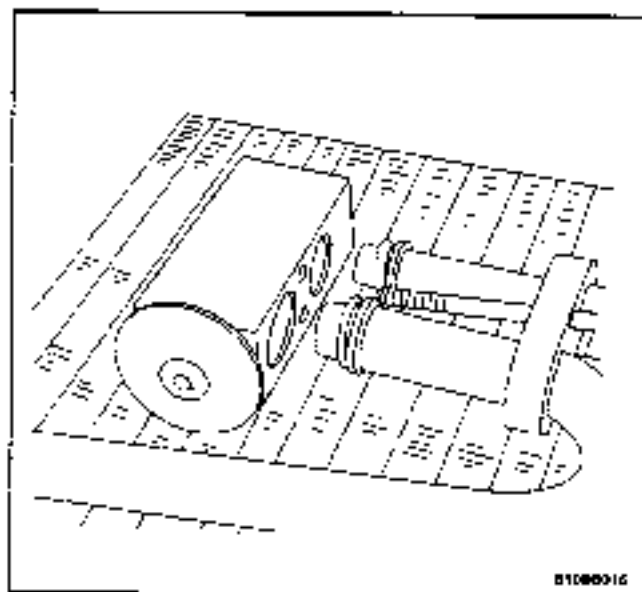
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Remove the heater/air distribution case assembly. Refer to "Heater/Air Distribution Case Assembly" in this section.
2. Remove the screws that secure the evaporator case halves.
3. Remove the evaporator core case cover.
4. Slide the evaporator flange support plate upward to facilitate removal of the evaporator.



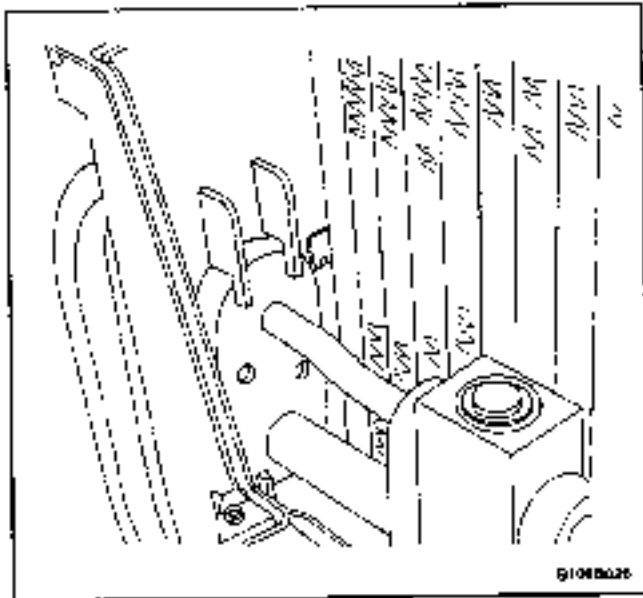
5. Remove the evaporator core from the case.
6. Remove the air conditioning expansion valve. Refer to "A/C Expansion Valve" in this section.



### Installation Procedure

1. Install the O-rings onto the evaporator tubes.
2. Install the A/C expansion valve. Refer to "A/C Expansion Valve" in this section.

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3. Install the evaporator core into the case. Center the evaporator flange in the case opening.
4. Assemble the evaporator case halves with the screws.
5. Install the heater/air distributor case assembly. Refer to "Heater/Air Distributor Case Assembly" in this section.



## UNIT REPAIR

### V5 AIR CONDITIONING COMPRESSOR OVERHAUL

#### COMPRESSOR OVERHAUL

Refer to Section 7B, *Manual Control Heating, Ventilation, and Air Conditioning System* for details of the following procedures:

- Clutch Coil.
- Clutch Plate and Hub Assembly.
- Clutch Rotor and Bearing.
- Component Locator V5 Compressor.
- Control Valve Assembly.
- Cylinder to Front Head O-Ring.
- Leak Testing (External).
- Pressure Relief Valve.
- Rear Head, Gasket, Valve Plate, Reed Plate, and O-Ring.
- Shaft Seal Replacement.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### GENERAL INFORMATION

#### THE V5 SYSTEM

Refer to Section 7B, *Manual Control Heating, Ventilation, and Air Conditioning System* for general information details for the following:

- System Components - Functional.
- The V5 A/C System.
- V5 Compressor - Description of Operation.
- V5 Compressor - General Description

### SYSTEM COMPONENTS - CONTROL

#### Controller

The operation of the A/C system is controlled by the switches on the control head. This console-mounted heating and ventilation system contains the following knobs and display:

#### The Temperature Control Push Knobs

1. Raise the temperature of the air entering the vehicle by pressing the top switch, with the red arrow pointing upward.
2. Lower the temperature by pressing the bottom switch, with the blue arrow pointing downward.
3. Actuate the air mix door by an electric motor.
4. Vary the mix of the air passing through the heater core with the air bypassing the core.

Each press of a switch changes the set temperature by increments of 0.5° C (1°F). This is shown in the temperature window on the function display.

#### The Function Display

This is an LCD display indicating the status of the control settings selected. Starting from the left end of the display, the sections are as follows:

1. Temperature setting - Indicates the temperature set with the temperature control knob.
2. Auto status - Indicates whether the system is operating in the full auto mode or the manual mode.
3. Defroster icon - Indicates manual selection of full defrost mode.
4. Mode - Indicated by icon, the mode chosen by the system in auto (or by the operator in manual) is shown by an illumination arrow indicating the air path.
5. A/C - A snowflake icon indicating whether the A/C is ON or OFF.
6. Fan speed - Indicates the fan speed by illuminating a bar based on the segment at the front, for low speed,

and adding additional segments in order up to the fifth, for high speed.

#### Eight Additional Push Knobs

1. Full defrost - Causes the mode motors to direct all air to the windshield and side window outlets for maximum defrosting.
2. Air intake - Switches between fresh air intake, the default, and recirculating air. Airflow arrows on the display indicate the mode in effect.
3. Full Auto Switch - Maintains the set temperature automatically. In this mode, the fully automatic temperature control (FATC) system controls the following:
  - The air mix door motor.
  - The mode door motor.
  - The blower motor speed.
  - The inlet air door motor.
  - A/C ON/OFF.
4. OFF Switch - Turns the automatic air conditioning and fan control off.
5. Mode Switch - Allows manual selection of the airflow direction.
  - Selection is shown on the function display.
  - Each time the mode switch is pressed, the next function is displayed.
6. A/C Switch - Allows manual selection and control of the air conditioning function.
7. Fan Control Switch - Allows manual selection among five fan speeds.
8. Defogger Switch - Turns on the electric defogging heater in the rear window and the outside rearview mirrors, if the vehicle is equipped with heated mirrors.

#### Pressure Transducer

Pressure transducer switching incorporates the functions of the high-pressure and the low-pressure cutoff switches along with the fan cycling switch. The pressure transducer is located in the high-side liquid refrigerant line behind the right strut tower, between the right strut tower and the fire wall. The output from this pressure transducer goes to the electronic control module (ECM), which controls the compressor function based on the pressure signal.

#### Wide-Open Throttle (WOT) Compressor Cutoff

During full-throttle acceleration, the throttle position sensor (TPS) sends a signal to the ECM, which then controls the compressor clutch.

#### High RPM Cutoff

As engine rpm approaches the maximum limit, the ECM will disengage the compressor clutch until the engine slows to a lower rpm.

# **RESTRAINTS**

## **CONTENTS**

<b>SECTION 8A</b>	<b>SEAT BELTS</b>
<b>SECTION 8B</b>	<b>SUPPLEMENTAL INFLATABLE RESTRAINTS (SIR)</b>



# SECTION 8A

## SEAT BELTS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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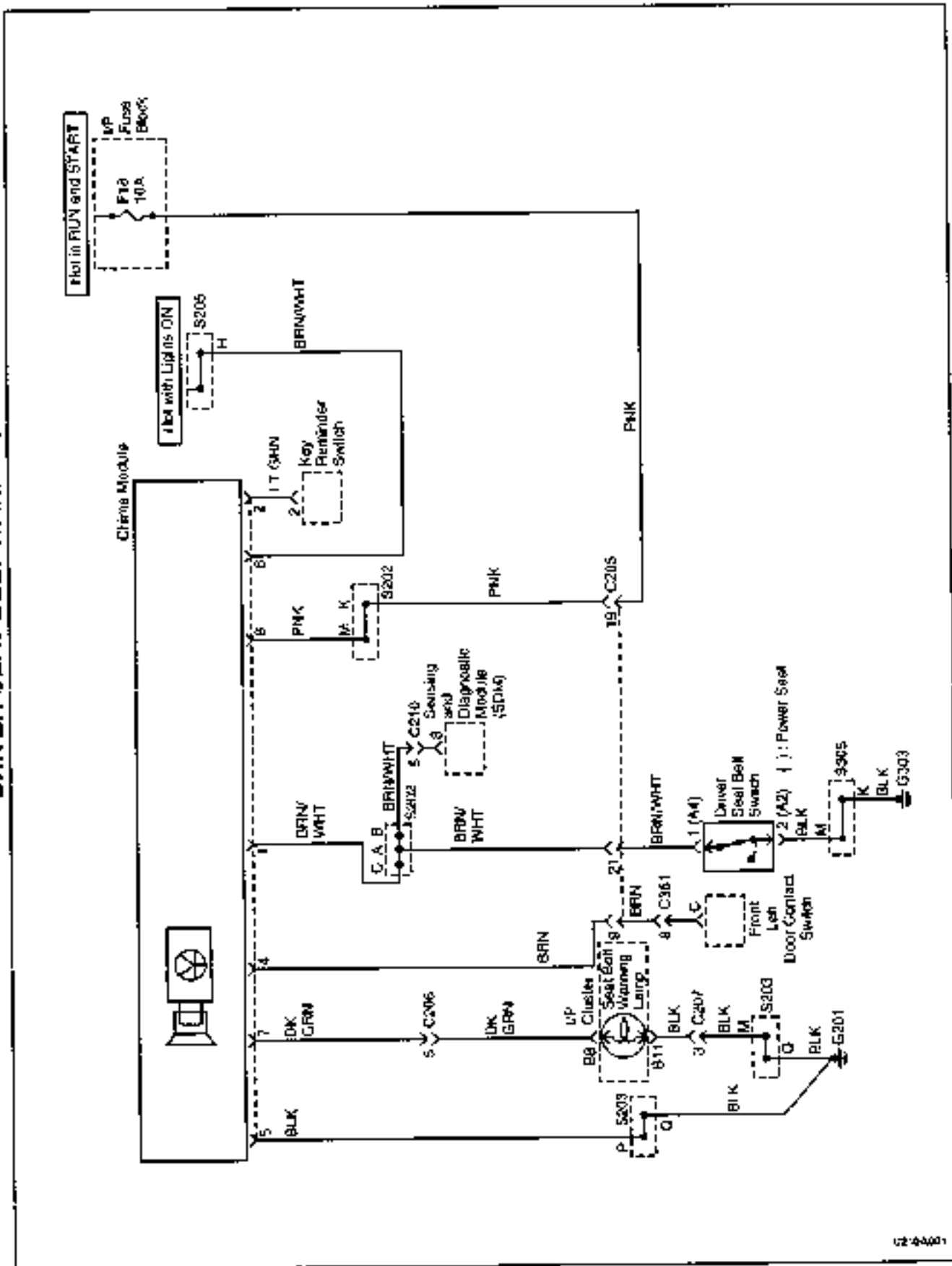
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Front Seat Belt Height Adjuster Bolts	19	14	-
Seat Belt Anchor Bolt	35	25	-
Seat Belt Bracket Screws	3	-	27
Seat Belt Retractor Screw	10	-	89

# SCHEMATIC AND WIRING DIAGRAMS

## DRIVER SEAT BELT WARNING



12-44001

## DIAGNOSIS

### DRIVER SEAT BELT WARNING

#### Seat Belt Warning Lamp Does Not Turn On at Any Time

Step	Action	Value(s)	Yes	No
1	1. Unbuckle the seat belt. 2. Close the doors of the vehicle. 3. Turn the ignition ON. Is the seat belt warning chime OK?	-	Go to Step 13	Go to Step 2
2	Check the seat belt warning fuse F18. Is fuse F18 blown?	-	Go to Step 3	Go to Step 4
3	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
4	1. Turn the ignition ON. 2. Check the voltage at fuse F18. Is the voltage equal to the specified value?	11-14 v	Go to Step 6	Go to Step 5
5	Repair the open power supply circuit for fuse F18. Is the repair complete?	-	System OK	-
6	1. Disconnect the seat belt switch connector (located under the driver's seat). 2. Connect a jumper between the terminals on the harness side of the seat belt switch connector. 3. Turn the ignition ON. Does the seat belt warning lamp turn on?	-	Go to Step 7	Go to Step 8
7	Replace the seat belt switch. Is the repair complete?	-	System OK	-
8	1. Disconnect the chime module electrical connector. 2. Turn the ignition ON. 3. Check the voltage at the chime module connector, terminal 5. Is the voltage equal to the specified value?	11-14 v	Go to Step 10	Go to Step 9
9	Repair the open circuit between fuse F18 and the chime module. Is the repair complete?	-	System OK	-
10	1. The chime module connector is disconnected. 2. Turn the ignition OFF. 3. Use an ohmmeter to measure resistance between ground and terminal 5 of the chime module. Is the resistance equal to the specified value?	$\approx 0 \Omega$	Go to Step 12	Go to Step 11
11	Repair the ground circuit for the chime module. Is the repair complete?	-	System OK	-
12	1. The chime module connector is disconnected. 2. Turn the ignition OFF. 3. Make sure the driver's seat belt is unbuckled. 4. Use an ohmmeter to measure resistance between ground and terminal 1 of the chime module. Is the resistance equal to the specified value?	$\approx 0 \Omega$	Go to Step 14	Go to Step 13

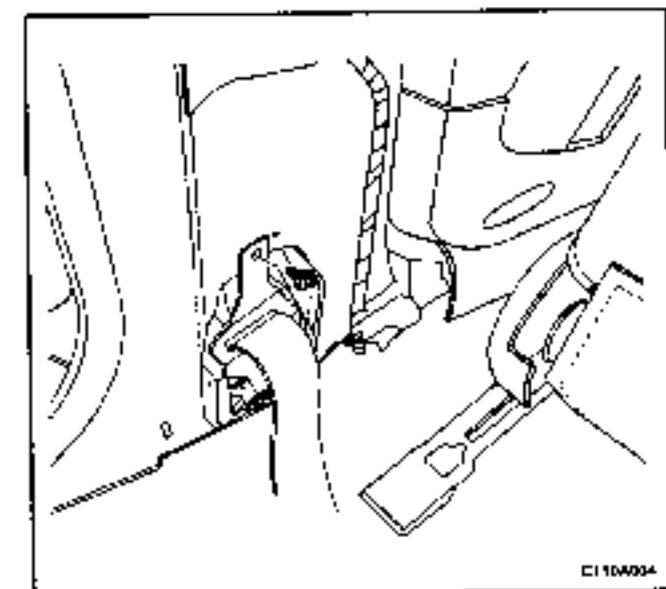
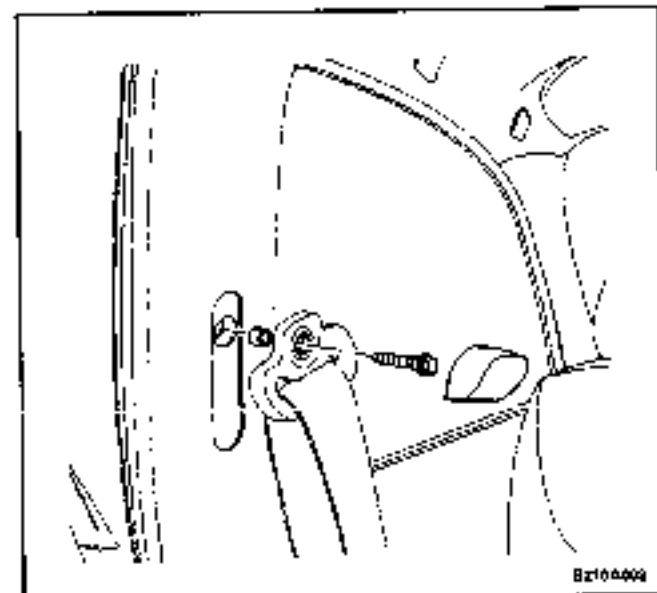
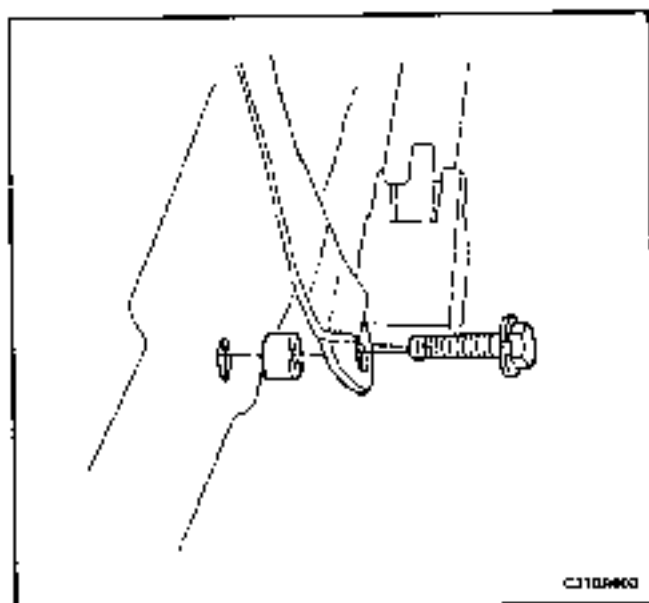
## Seat Belt Warning Lamp Does Not Turn On at Any Time (Cont'd)

Step	Action	Value(s)	Yes	No
13	Repair the open circuit between ground and terminal 1 of the chime module connector. Is the repair complete?	-	System OK	-
14	1. Remove the instrument cluster. 2. Check the seat belt warning lamp bulb. Is the bulb OK?	-	Go to Step 16	Go to Step 15
15	Replace the warning lamp bulb. Is the repair complete?	-	System OK	-
16	1. If the seat belt switch and the chime module were disconnected in a previous step, make sure that they have been reconnected. 2. Leave the seat belt unbuckled. 3. Turn the ignition ON. 4. Check the voltage at terminal B6 of the instrument cluster. Is the voltage equal to the specified value?	11-14 v	Go to Step 20	Go to Step 17
17	1. Disconnect the chime module connector. 2. Use an ohmmeter to check for continuity between the chime module connector terminal 7 and the instrument cluster connector B6. Did the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 19	Go to Step 18
18	Repair the open circuit between the chime module terminal 7 and the instrument cluster terminal B6.	-	System OK	-
19	Replace the chime module. Is the repair complete?	-	System OK	-
20	Repair the open circuit between instrument cluster terminal B11 and ground. Is the repair complete?	-	System OK	-



## Seat Belt Warning Chime Does Not Work

Step	Action	Value(s)	Yes	No
1	1. Leave the seat belt unbuckled. 2. Close the doors of the vehicle. 3. Turn the ignition ON. Is the seat belt warning lamp ON?	-	Go to Step 2	Go to "Seat Belt Warning Lamp Does Not Turn On at Any Time"
2	1. Buckle the seat belt. 2. Open the driver's door and turn the headlamps on. 3. Turn the ignition ON. Does the chime work as a door-open or headlamps-on warning?	-	Go to Step 3	Go to Step 4
3	Replace the chime module. Is the repair complete?	-	System OK	-
4	1. Disconnect the chime module electrical connector. 2. Use an ohmmeter to measure the resistance between ground and terminal 5 of the chime module connector. Is the resistance equal to the specified value?	$\sim 0 \Omega$	Go to Step 3	Go to Step 5
5	Repair the open circuit between ground and terminal 5 of the chime module connector. Is the repair complete?	-	System OK	-



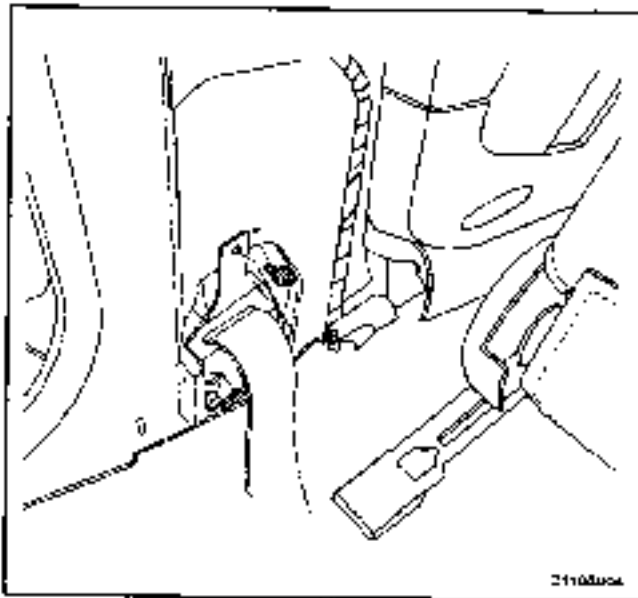
## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### PRETENSIONER FRONT SEAT BELT

##### Removal Procedure

1. Remove the plastic cap to reveal the lower B-pillar seat belt anchor.
2. Remove the bolt and the lower B-pillar seat belt anchor.
3. Remove the lower B-pillar trim panel. Refer to Section 9G, *Interior Trim*.
4. Remove the plastic cap to reveal the upper B-pillar seat belt anchor.
5. Remove the bolt and the upper B-pillar seat belt anchor.
6. Remove the screws and the seat belt bracket.
7. Remove the screw and the seat belt retractor.



### Installation Procedure

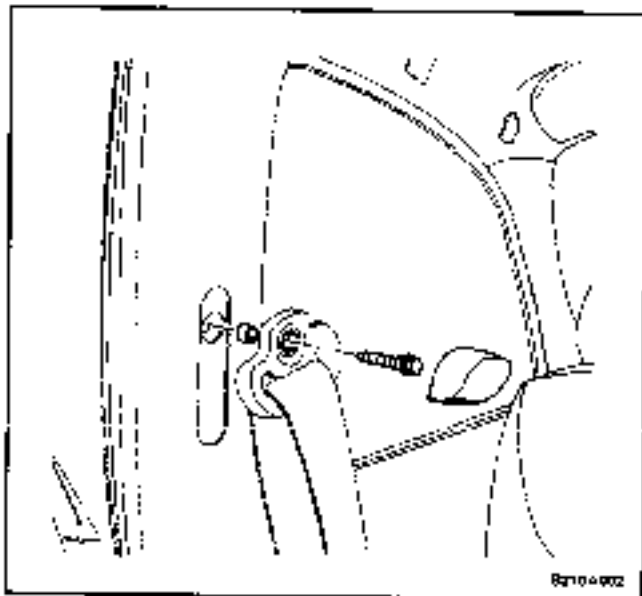
**Caution:** Failure to install the correct retractor screw can cause the pretensioner seat belt to malfunction in an accident, possibly resulting in personal injury.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the seat belt retractor with the screw.

#### Tighten

Tighten the seat belt retractor screw to 10 N•m (89 lb-in).



2. Install the seat belt bracket with the screws.

#### Tighten

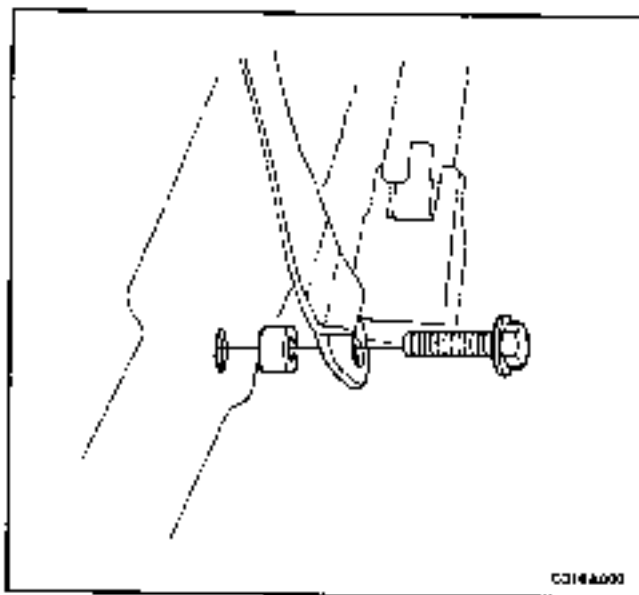
Tighten the seat belt bracket screws to 3 N•m (27 lb-in).

3. Install the upper B-pillar seat belt anchor with the bolt.

#### Tighten

Tighten the seat belt anchor bolt to 35 N•m (26 lb-ft).

4. Install the seat belt anchor plastic cap.



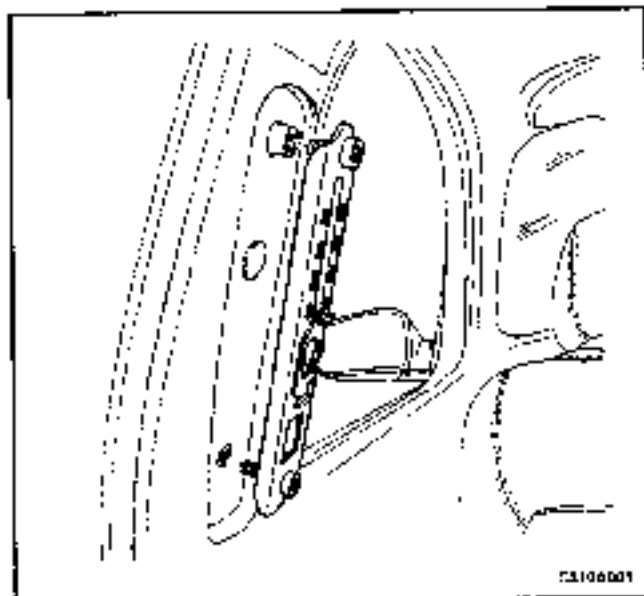
5. Install the lower B-pillar trim panel. Refer to Section 9G, Interior Trim.

6. Install the lower B-pillar seat belt anchor with the bolt.

#### Tighten

Tighten the seat belt anchor bolt to 35 N•m (26 lb-ft).

7. Install the seat belt anchor plastic cap.

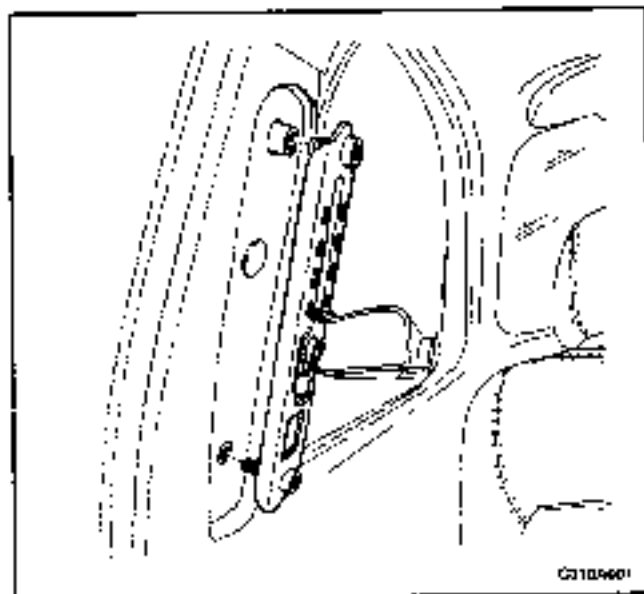


C1106001

## FRONT SEAT BELT HEIGHT ADJUSTER

### Removal Procedure

- 1 Remove the upper B-pillar trim panel. Refer to Section 9G, Interior Trim.
- 2 Remove the bolts and the seat belt height adjuster.



C1106001

### Installation Procedure

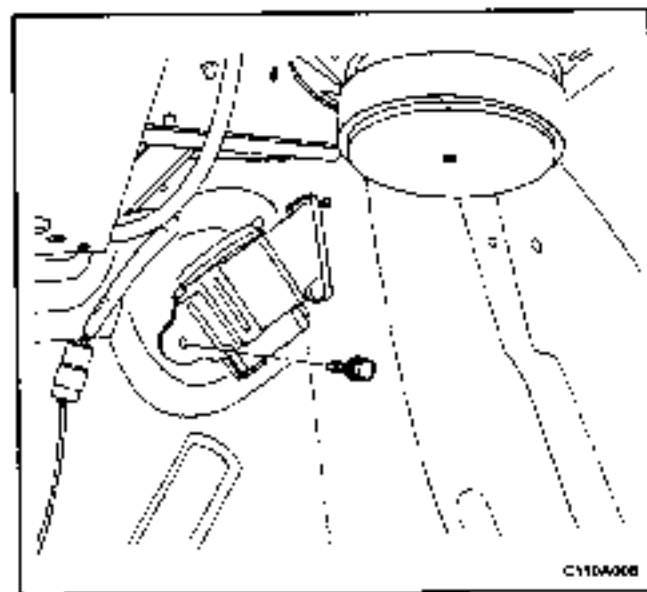
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

- 1 Install the seat belt height adjuster with the bolts.

#### Tighten

Tighten the front seat belt height adjuster bolts to 19 N•m (14 lb-ft).

- 2 Install the upper B-pillar trim panel. Refer to Section 9G, Interior Trim.

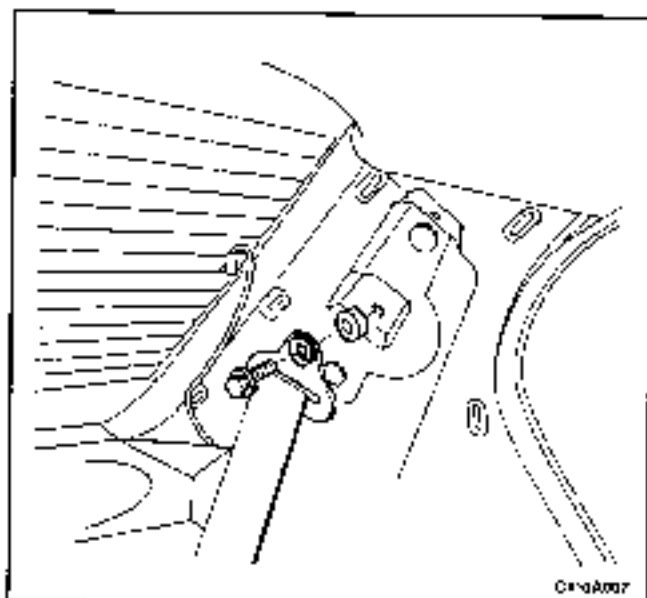


C110A008

## THREE-POINT ELR REAR OUTBOARD SEAT BELT

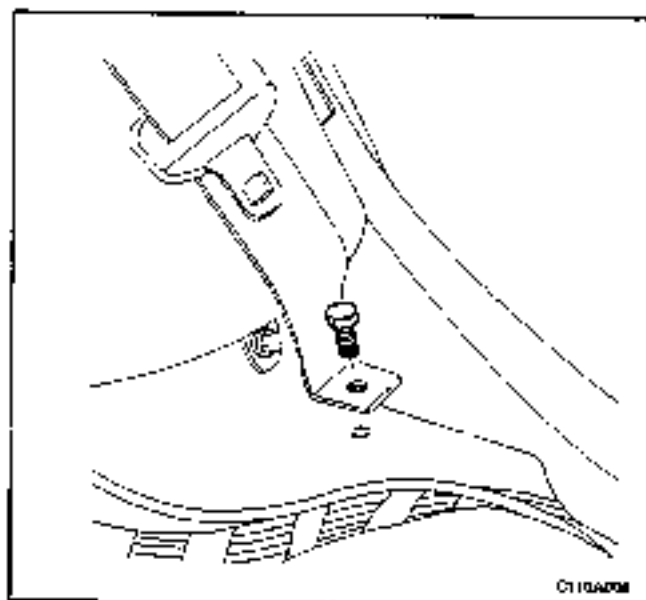
### Removal Procedure

- 1 Remove the deck lid sill plate cover and the luggage compartment wheelhouse trim panel. Refer to Section 9G, Interior Trim.
- 2 Remove the bolt and the luggage compartment seat belt anchor.



C110A007

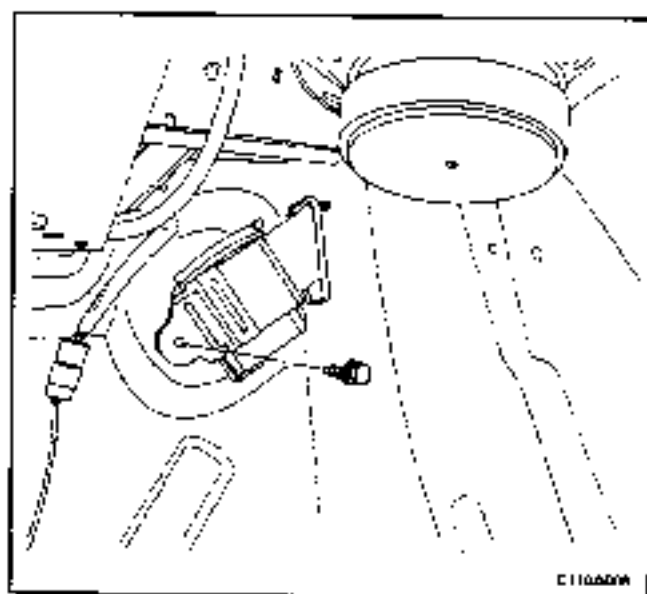
3. Remove the bolt and the C-pillar seat belt anchor.



C110A008

4. Remove the bolt and the floor seat belt anchor.

5. Remove the seat belt.



C110A009

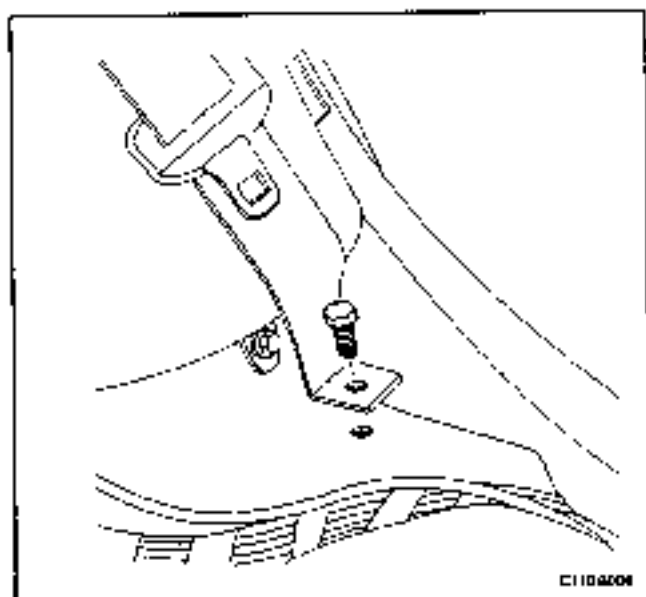
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the luggage compartment seat bolt anchor with the bolt.

### Tighten

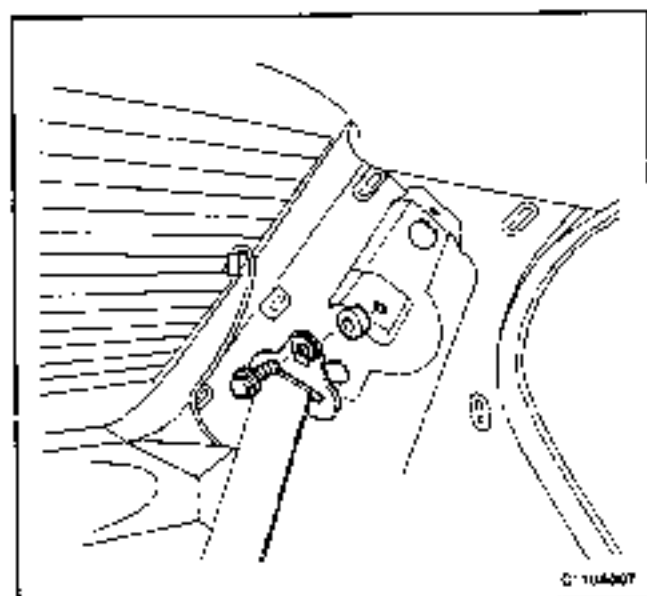
Tighten the seat belt anchor bolt to 35 N•m (26 lb•ft).



2. Feed the free end of the seat belt from the luggage compartment through the deck lid sill plate.
3. Install the floor seat belt anchor with the bolt.

**Tighten**

Tighten the seat belt anchor bolt to 35 N•m (26 lb-ft).



4. Install the C-pillar seat belt anchor with the bolt.

**Tighten**

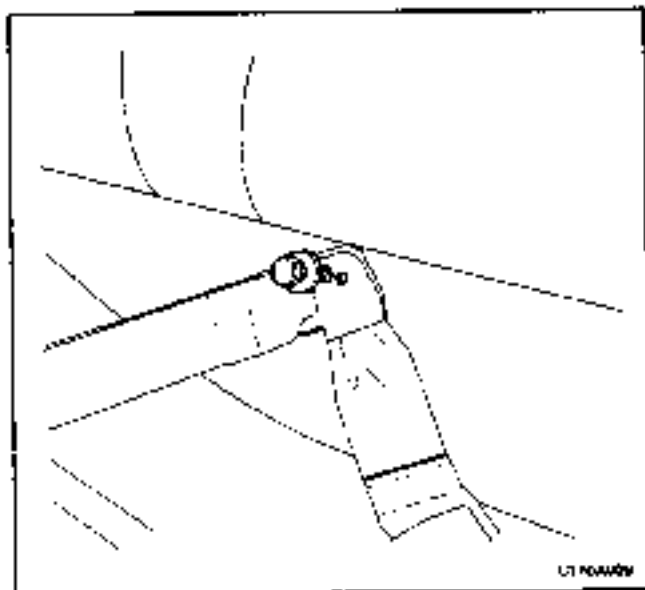
Tighten the seat belt anchor bolt to 35 N•m (26 lb-ft).

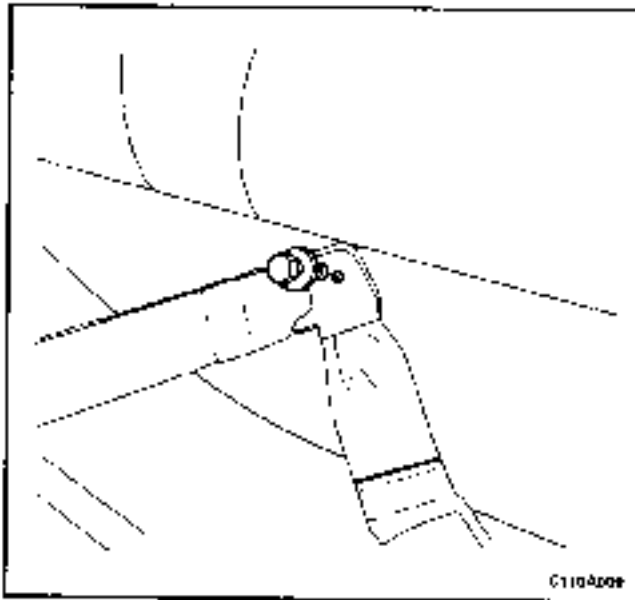
5. Install the deck lid sill plate cover and the luggage compartment wheelhouse trim panel. Refer to Section 9G, Interior Trim.

**TWO-POINT LAP REAR CENTER SEAT BELT**

**Removal Procedure**

1. Remove the rear seat cushion. Refer to Section 9H, Seats.
2. Remove the bolts and the seat belt anchors.





### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the seat belt anchors with the bolts.

### Tighten

Tighten the seat belt anchor bolts to 35 N•m (26 lb-ft).

2. Install the rear seat cushion. Refer to *Section 9H, Seats*.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### DRIVER SEAT BELT REMINDER

The driver's safety belt incorporates a safety belt reminder light in the I/P cluster to remind the driver if the safety belt is not fastened when the ignition is turned ON.

### PRETENSIONER FRONT SEAT BELT

The pretensioner front seat belt is standard. It contains a mechanically controlled pyrotechnical retractor which reduces the seat belt slack when it is activated in a head-on or angled front collision. The pretensioner front seat belt must be replaced after an accident that causes its activation.

### THREE-POINT ELR REAR OUTBOARD SEAT BELT

The rear outboard seating positions use the three-point emergency locking retractor (ELR) seat belts. The three-point ELR seat belt is always unlocked, allowing the passenger freedom of movement, except in emergencies (rapid deceleration, rapid acceleration, or hard cornering maneuvers).

### TWO-POINT LAP REAR CENTER SEAT BELT

The two-point lap rear center seat belt is a single continuous length of webbing. The webbing is routed from the anchor through a latch plate and into a single retractor.

## OPERATIONAL CHECKS

### Caution:

- *Keep sharp objects and potentially damaging objects away from the seat belts.*
  - *Avoid bending or damaging any portion of the buckle or the latch plate.*
  - *Do not bleach or dye the belt webbing. Use only mild soap and water in order to clean the belts.*
  - *When installing the seat belt anchor bolts and the screws, start the bolts and the screws by hand in order to prevent cross-threading.*
  - *Do not attempt any repairs on the retractor mechanisms or the covers. Replace any defective assemblies with new assemblies.*
  - *Replace any belts that are cut or damaged in any way.*
1. Inspect all seat belt anchor bolts and the screws in order to verify that they are secure.
  2. Inspect the seat belt buckle. The buckle must lock and unlock easily.
  3. After inserting the latch into the buckle, tug sharply on the belt. The buckle must remain locked.
  4. Fully extend the shoulder belt portion to make sure that there is no twisting or tears in the belt.
  5. Let the shoulder belt retract fully. The belt should retract easily.



## SECTION 8B

# SUPPLEMENTAL INFLATABLE RESTRAINTS (SIR)

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## 8B-2 SUPPLEMENTAL INFLATABLE RESTRAINTS (SIR)

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		Clock Spring	8B-85



## SPECIFICATIONS


### FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Clock Spring Mounting Screws	1.25	-	11
Driver Airbag Module Mounting Bolts	4.5	-	41
Passenger Airbag Mounting Bolts	10	-	89
Sensing and Diagnostic Module Mounting Bolts	10	-	89

## SPECIAL TOOLS

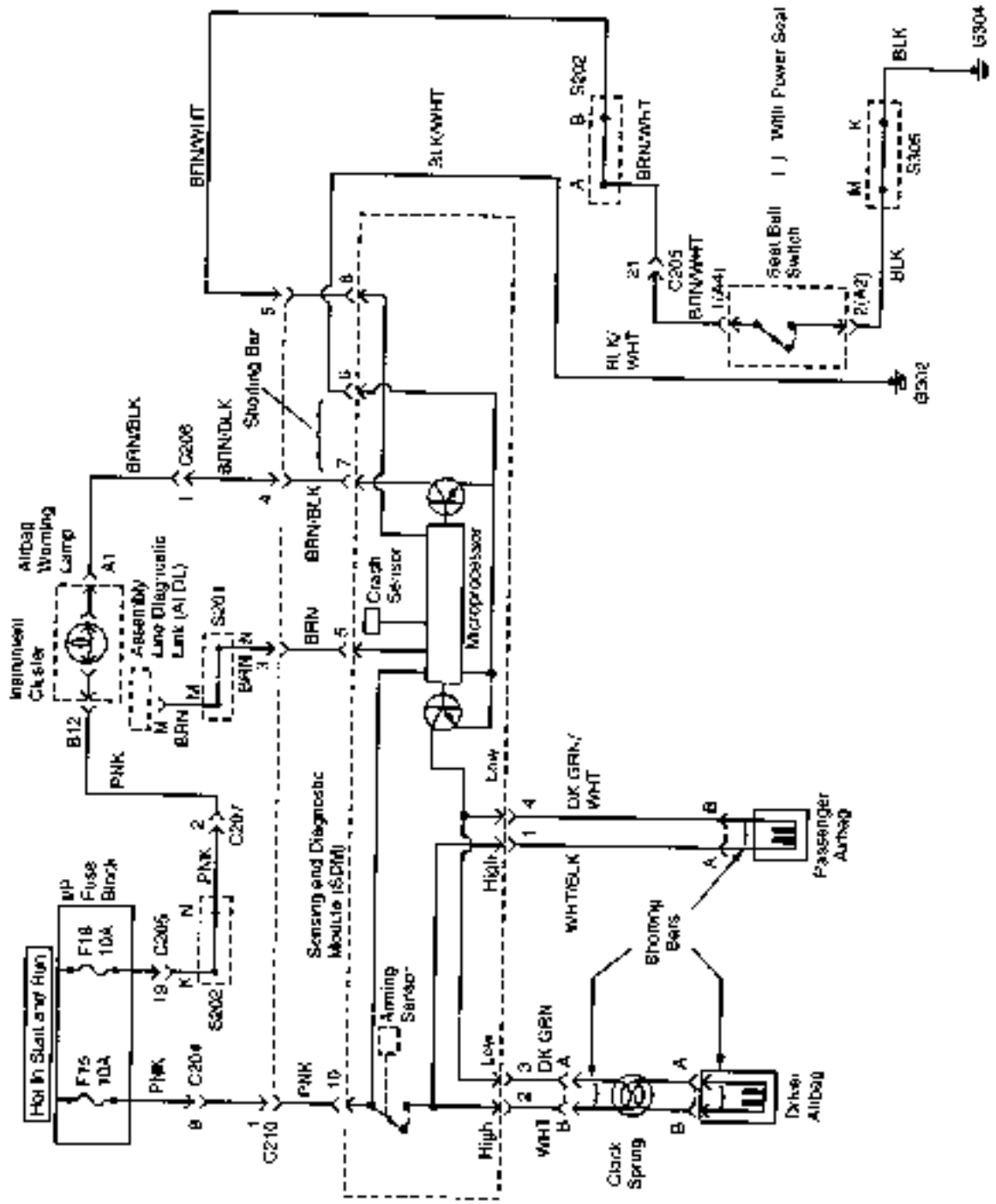
### SPECIAL TOOLS TABLE

	<b>Deployment Tool</b>
	<b>Scan Tool</b>

	<b>Wiring Harness Checker</b>
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# SCHMATIC AND ROUTING DIAGRAMS

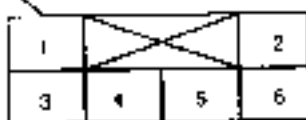
## SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM



C310800

**CONNECTOR END VIEWS**

PWK



C210 Female

BRN/BLK



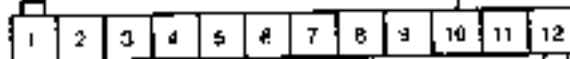
C208 Female

BRN



Assembly Line  
Data Link (ALDL)

WHI/BLK



Sensing and Diagnostic Module  
(SDM) Connector

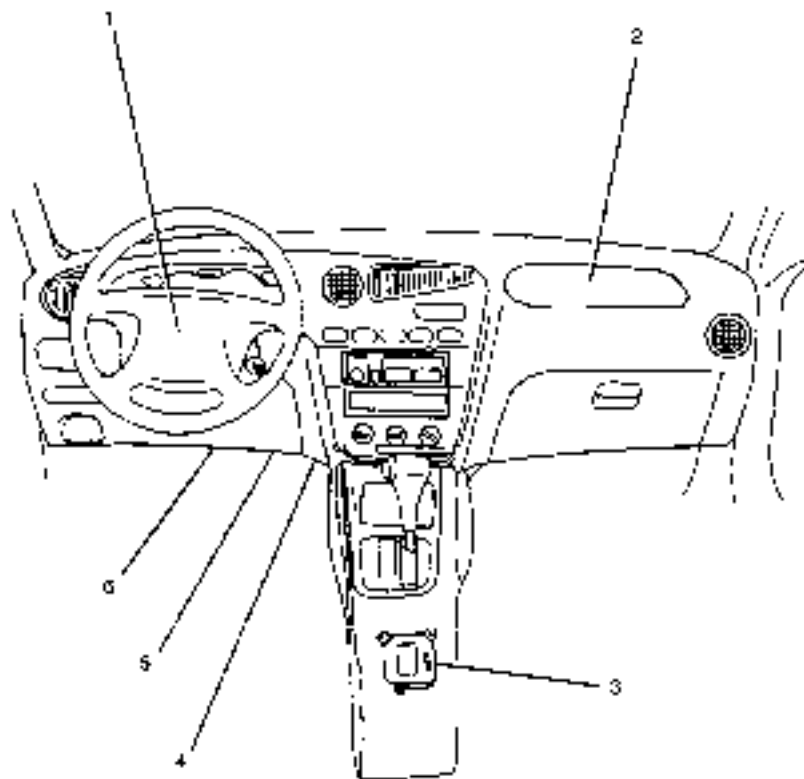
PWK

CS100002

## COMPONENT LOCATOR

### SIR COMPONENT LOCATION VIEW

(Left-Hand Drive Shown, Right-Hand Drive Similar)



C1109003

- |                                       |  |
|---------------------------------------|--|
| 1 Driver Airbag                       | 4 Assembly Line Diagnostic Link (ALDL) Connector |
| 2 Passenger Airbag                    | 5 Connector C209                                 |
| 3 Sensing and Diagnostic Module (SDM) | 6 Clock Spring Connector                         |

## DIAGNOSIS

### DIAGNOSTIC TROUBLE CODES (DTC)

The supplemental inflatable restraint (SIR) Diagnostic System Check must always be the starting point for any SIR system diagnosis. The Diagnostic System Check reveals diagnostic trouble codes through the use of a scan tool, and it also checks for proper AIRBAG warning indicator operation.

Two types of diagnostic trouble codes may be recorded:

1. Current diagnostic trouble codes represent malfunctions that are presently being detected. Current diagnostic trouble codes are stored in random access memory.
2. History diagnostic trouble codes represent all malfunctions that were detected since the last time that history memory was cleared. History diagnostic trouble codes are stored in the electronically erasable programmable read only memory (EEPROM).

### SCAN TOOL DIAGNOSTICS

A scan tool can read serial data from terminal M of the assembly line diagnostic link (ALDL). A specific replaceable cartridge must be attached to the scan tool before the scan tool can communicate with the sensing and diagnostic module (SDM) for the purpose of diagnostics. The scan tool is used to read diagnostic trouble codes, and to clear some diagnostic trouble codes after a repair is completed. By design, certain codes cannot be cleared. To use the scan tool, turn the ignition OFF, connect the scan tool to the ALDL, and turn the ignition switch to ON. Follow the instructions in the scan tool manual. The SDM sends serial data from terminal 5 of the SDM to terminal M of the ALDL.

### USE OF SPECIAL TOOLS

A digital multimeter is used to measure voltage and resistance. A scan tool is used to read and clear diagnostic trouble codes. A wiring harness checker and deployment tool are under development, and service bulletins will be issued if these tools become operational.

### SIR DIAGNOSTIC SYSTEM CHECK

**Notice:** If the vehicle interior has been exposed to extensive water intrusion such as water leaks, driving through high water, flooding, or other causes, the sensing and diagnostic module (SDM) and the SDM connector may need to be replaced. With the ignition OFF, inspect the area around the SDM, including the carpet. If any significant soaking or evidence of previous soaking is detected, the water must be removed, water damage repaired, and the SDM and SDM connector must be replaced. Before attempting any of these repairs, the supplemental inflatable restraint (SIR) system must be disabled. Refer to 'Disabling the SIR System' and 'Sensing and Diagnostic Module (SDM)' in this section

for instructions on how to disable the SIR system and replace the SDM.

The diagnostic procedures used in this section are designed to find and repair SIR system conditions. To get the best results, it is important to use the diagnostic charts and follow the sequence listed below.

1. Perform the SIR Diagnostic System Check. The SIR Diagnostic System Check must be the starting point of any SIR diagnostics. The SIR Diagnostic System Check reveals diagnostic trouble codes through the use of a scan tool, and it also checks for proper AIRBAG indicator operation.
2. Refer to the proper diagnostic chart as directed by the SIR Diagnostic System Check. The SIR Diagnostic System Check will lead you to the correct chart to diagnose any SIR system malfunctions. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts placement.
3. Repeat the SIR Diagnostic System Check after any repair or diagnostic procedures have been performed. Performing the SIR Diagnostic System Check after all repair or diagnostic procedures will ensure that the repair has been made correctly and that no other malfunctions exist.

#### Circuit Description

When the ignition switch is first turned to ON, Ignition 1 voltage is applied from the airbag fuse to the sensing and diagnostic module (SDM) at input terminal 10. The SDM responds by flashing the AIRBAG indicator seven times and then turning it off while the SDM performs tests on the SIR system.

#### Diagnostic Aids

The order in which diagnostic trouble codes are diagnosed is very important. Failure to diagnose the DTCs in the order specified may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacement.

#### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. This test will identify the stored diagnostic trouble codes and whether they are current or history. A history DTC indicates that the malfunction has been repaired or is intermittent.
6. This test differentiates between an indicator that will not come on and an indicator that stays on when it should be off.
7. See the first caution below.
9. See the cautions below.
10. This test will determine whether history diagnostic trouble codes are stored and will identify them.
11. A history DTC indicates that the malfunction has been repaired or is intermittent.

## SIR Diagnostic System Check

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition switch to ON. 2. Observe the AIRBAG indicator as the ignition is being turned ON. Does the indicator flash seven times?	-	Go to Step 2	Go to Step 6
2	Observe the AIRBAG indicator after it flashed seven times. Does the indicator turn OFF?	-	Go to Step 10	Go to Step 3
3	1. Turn the ignition to LOCK and remove the key. 2. Connect the scan tool to the assembly line diagnostic link (ALDL). Follow the directions given in the scan tool manual. 3. Turn the ignition ON. 4. Request the SIR DTC display with the scan tool. 5. Record all DTCs indicating each as either a current or a history DTC. Are only history DTCs shown?	-	Refer to the DTC chart for any DTC that was set, and refer to the Diagnostic Aids for that specific DTC	Go to Step 4
4	Check the recorded DTCs. Are current DTCs 1B, 24, or 51 set?	-	Go to the DTC chart indicated by any of these three codes	Go to Step 5
5	Check the recorded DTCs. Are there any other current DTCs shown?	-	Diagnose the remaining current DTCs from lowest number to highest	Refer to the DTC chart for any history DTC that was set, and refer to "Diagnostic Aids" for that specific DTC
6	Observe the AIRBAG indicator after the ignition has been turned ON. Does the AIRBAG indicator stay on?	-	Go to "AIRBAG Warning Lamp Stays on with Ignition Switch ON"	Go to Step 7
7	1. Turn the ignition to LOCK and remove the key. 2. Temporarily disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Check the AIRBAG indicator bulb and circuit. Are the bulb and the bulb circuit in good condition?	-	Go to Step 9	Go to Step 8

## SIR Diagnostic System Check (Cont'd)

Step	Action	Value(s)	Yes	No
8	1. Replace the bulb or repair the bulb circuit. 2. Connect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to Step 1	-
9	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Reconnect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to Step 1	-
10	1. Turn the ignition to LOCK and remove the key. 2. Connect the scan tool to the assembly line diagnostic link (ALDL) connector. Follow the directions given in the scan tool manual. 3. Turn the ignition to ON. 4. Request the SIR DTC display with the scan tool. 5. Record all history DTCs. Are any SIR DTCs displayed?	-	Go to Step 11	System OK
11	Turn the ignition to OFF. Is DTC 71 set?	-	Go to "DTC 71 Internal SDM Failure"	Refer to the DTC chart for any history DTC that was set, and refer to "Diagnostic Aids" for that specific DTC.

## SENSING AND DIAGNOSTIC MODULE (SDM) INTEGRITY CHECK

The following diagnostic chart must be followed when all circuitry outside the SDM has been found to operate properly, as indicated by following the appropriate diagnostic trouble code (DTC) chart or symptom chart. This chart verifies the need for SDM replacement.

### Circuit Description

When the SDM recognizes ignition 1 voltage greater than 8.2 volts at terminal 10 of the SDM, the AIRBAG indicator is flashed seven times to verify operation. At this time the SDM performs turn-on tests followed by resistance measurement tests and continuous monitoring tests. When a malfunction is detected, the SDM sets a current DTC and illuminates the AIRBAG indicator. When the malfunction is no longer detected and/or the ignition switch is cycled, the SDM will clear current DTCs and move them to a history file, except for DTCs 18, 24, 61, 53, and sometimes 71. DTCs 18, 24, 51, and

53 will not clear using a scan tool because these codes require replacement of the SDM. The SDM must be replaced only after the malfunction that set the DTC has been repaired.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

1. This test confirms a current malfunction. If no current malfunction is occurring (history DTC set), refer to "Diagnostic Aids" for the appropriate DTC. The SDM should not be replaced for a history DTC except when directed.
2. This test checks for a malfunction introduced into the supplemental inflatable restraint (SIR) system during the diagnostic process. It is extremely unlikely that a malfunctioning SDM would cause a new malfunction to occur during the diagnostic process.
4. See the cautions below.



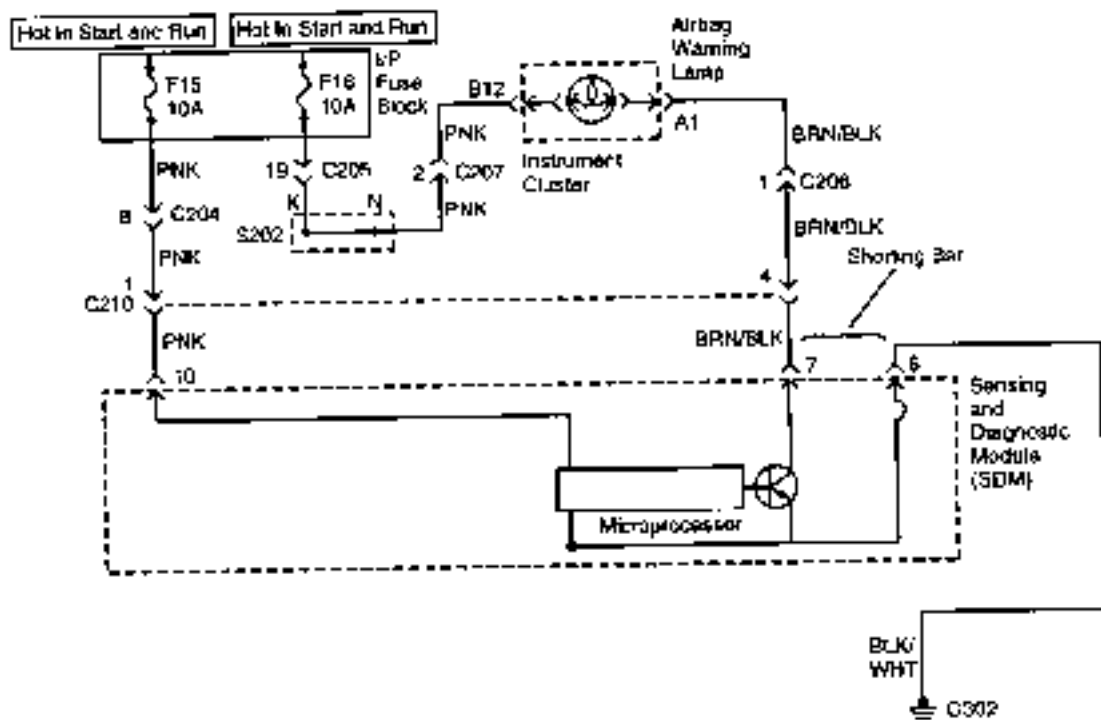
## Sensing and Diagnostic Module (SDM) Integrity Check

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition to LOCK and remove the key. 2. Connect all SIR system components, and ensure that all components are properly mounted. 3. Ensure that the ignition switch has been OFF for at least 30 seconds. 4. Observe the AIRBAG indicator as the ignition is turned ON. Does the indicator lamp flash seven times and then turn off?	-	Clear the SIR system DTCs and go to "Diagnostic System Check"	Go to Step 2
2	Using a scan tool, request the DTC display. Is the same DTC displayed that was previously occurring when the SIR Diagnostic System Check was previously performed?	-	Go to Step 3	Go to the table for the DTC indicated
3	1. Clear the SIR DTCs. 2. Turn the ignition OFF for at least 30 seconds. 3. Observe the AIRBAG indicator as the ignition is turned ON. Does the AIRBAG indicator flash seven times and then turn off?	-	System OK	Go to Step 4
4	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Connect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to "Diagnostic System Check"	-



CJ108003

## AIRBAG WARNING LAMP STAYS ON WITH IGNITION SWITCH ON

### Circuit Description

The AIRBAG indicator will stay on if the sensing and diagnostic module (SDM) connector is not securely attached to the SDM. There is a shoring bar in the SDM connector which completes the circuit between the indicator lamp circuit and ground. The shoring bar is disengaged when the connector is properly attached.

When the ignition switch is first turned to ON, Ignition 1 voltage is applied to the instrument fuse for the indica-

tor lamp and also to the AIRBAG fuse for the SDM input terminal 10. If ignition 1 is outside the range of 8.2-16 volts, the AIRBAG indicator will come on and stay on with no DTCs set.

A short to ground between the SDM and the indicator lamp could also cause the AIRBAG indicator to stay on.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

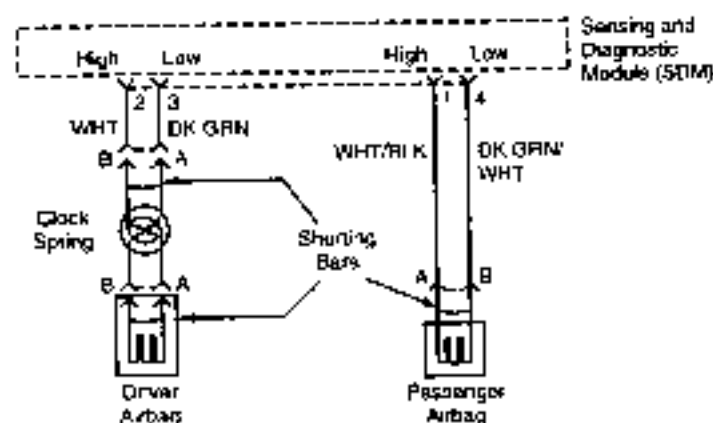
8. See the caution below.

**AIRBAG Warning Lamp Stays on with Ignition Switch ON**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the air-

bags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

Step	Action	Value(s)	Yes	No
1	Check the SDM connector to verify that it is properly connected to the SDM. Is the SDM connector properly connected?	-	Go to Step 3	Go to Step 2
2	Connect the SDM connector. Is the repair complete?	-	System OK	-
3	1. Turn the ignition OFF. 2. Disconnect the SDM connector. 3. Turn the ignition ON. 4. Check the voltage at the SDM connector terminal 10. Is the ignition voltage greater than the specified value?	8.2 v	Go to "SDM Integrity Check"	Go to Step 4
4	1. Turn the ignition ON. 2. Check the voltage supply to the AIRBAG fuse F15. Is the voltage within the specified value?	8.2-16 v	Go to Step 6	Go to Step 5
5	Repair the power supply to the AIRBAG fuse. Is the repair complete?	-	System OK	-
6	Check the AIRBAG fuse. Is the fuse in good condition?	-	Go to Step 8	Go to Step 7
7	Replace the AIRBAG fuse. Is the repair complete?	-	System OK	-
8	1. Turn the ignition to LOCK and remove the key. 2. Temporarily disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Check for an open circuit between terminal 10 of the SDM and the AIRBAG fuse F15. Is there an open circuit?	-	Go to Step 9	Go to Step 10
9	Repair the open circuit between the SDM and the AIRBAG fuse F15. Is the repair complete?	-	System OK	-
10	Repair the short circuit to ground between the AIRBAG indicator lamp and terminal 7 of the SDM. Is the repair complete?	-	System OK	-



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## DIAGNOSTIC TROUBLE CODE (DTC) 15 PASSENGER DEPLOYMENT LOOP RESISTANCE HIGH

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, Ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Passenger low terminal 4 is grounded through a current sink, and the passenger current source is connected to the passenger high terminal to allow a known amount of current to flow. By monitoring the voltage difference between passenger high and passenger low, the SDM calculates the combined resistance of the passenger inflator module, harness wiring, and connector terminal contacts.

### DTC 15 Will Set When

The combined resistance of the passenger deployment loop is above a specified value. The test is run once each ignition cycle during the resistance measurement test when

- No higher priority faults are detected when the ignition is turned ON.
- Ignition 1 voltage is above a specified value

### Action Taken

The SDM will turn on the AIRBAG indicator and set diagnostic trouble code (DTC) 15.

### DTC 15 Will Clear When

The ignition switch is turned OFF or the scan tool CLEAR CODES command is received.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. See the first caution below.
8. See the cautions below.

### Diagnostic Aids

An intermittent condition is likely to be caused by a poor connection at the passenger inflator module harness connector terminals, SDM terminals 1 or 4, or poor wire-to-terminal connections in that circuit. The test for this DTC is run only while the AIRBAG indicator is performing the bulb test. When a scan tool CLEAR CODES command is issued and the malfunction is still present, the DTC will not reappear until the next ignition cycle.

**DTC 15 - Passenger Deployment Loop Resistance High**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

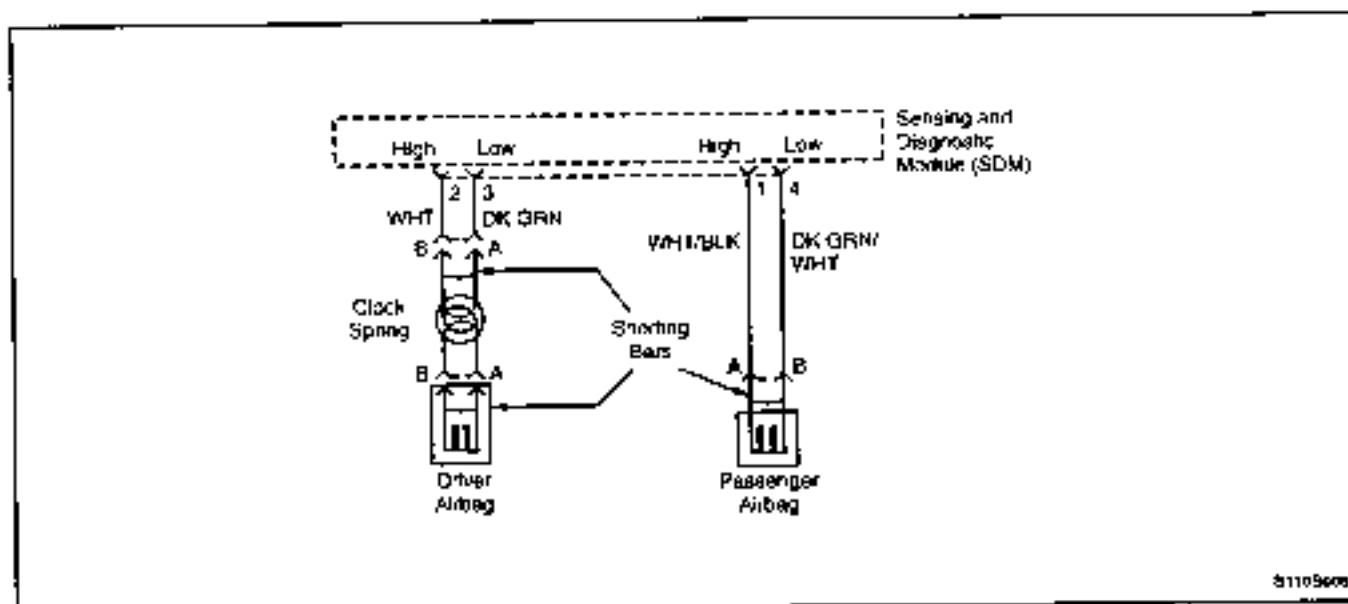
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag module yellow two-way connector located at the rear of the glove box. 3. Inspect the passenger airbag module connector for damage or loose terminals or wires. Is a faulty connector, terminal, or wire detected?		Go to Step 3	Go to Step 4
3	1. Replace the faulty connector, component, terminal, or wire. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	Check the SDM connector terminals 1 and 4 for loose terminals. Is a problem found?	-	Go to Step 5	Go to Step 6
5	1. Replace the loose terminals or wires. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	1. Disconnect the passenger airbag. 2. Using an ohmmeter, check for an open circuit between the SDM terminals 1 and 4 and the passenger airbag connector. • Refer to "Diagnostic Illustration 1" in this section. Does the ohmmeter show the specified value?	∞	Go to Step 7	Go to Step 8
7	1. Replace the open wires. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	1. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 2. Connect all SIR system components, and ensure that all components are properly mounted. 3. Connect the scan tool. 4. Turn the ignition ON. 5. Using the scan tool, request the DTCs. Is a current DTC 15 indicated?	-	Go to Step 9	Go to "SIR Diagnostic System Check"

## DTC 15 - Passenger Deployment Loop Resistance High (Cont'd)

Step	Action	Value(s)	Yes	No
9	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag electrical connector. 3. Replace the passenger airbag module. 4. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 16 PASSENGER DEPLOYMENT LOOP RESISTANCE LOW

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, Ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Passenger low terminal 4 is grounded through a current sink, and the passenger current source is connected to the passenger high terminal to allow a known amount of current to flow. By monitoring the voltage difference between the passenger high and passenger low terminals, the SDM calculates the combined resistance of the passenger inflator module, harness wiring, and connector terminal contacts.

### DTC 16 Will Set When

The resistance of the passenger deployment loop is below a specified value. The test is run once each ignition cycle during the resistance measurement test when

- No higher priority faults are detected when the ignition is turned ON.
- Ignition 1 voltage is above a specified value.

### Action Taken

The SDM will turn ON the AIRBAG indicator and set a diagnostic trouble code (DTC) 16.

### DTC 16 Will Clear When

The ignition switch is turned OFF or the scan tool CLEAR CODES command is received.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. See the first caution below.
5. See the first caution below.
10. See the cautions below.

### Diagnostic Aids

An intermittent condition is likely to be caused by a short between the passenger high and low circuits, a short between the passenger high circuit and the driver high circuit, or a short between the passenger high circuit and the driver low circuit. The problem could also be a malfunctioning shorting bar in the passenger airbag connector, which would require replacement of the passenger airbag module. The test for this DTC is run only while the AIRBAG indicator is performing the turn-on test. When a scan tool CLEAR CODES command is issued while the malfunction is still present, the DTC will not reappear until the next ignition cycle.



## DTC 16 - Passenger Deployment Loop Resistance Low

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

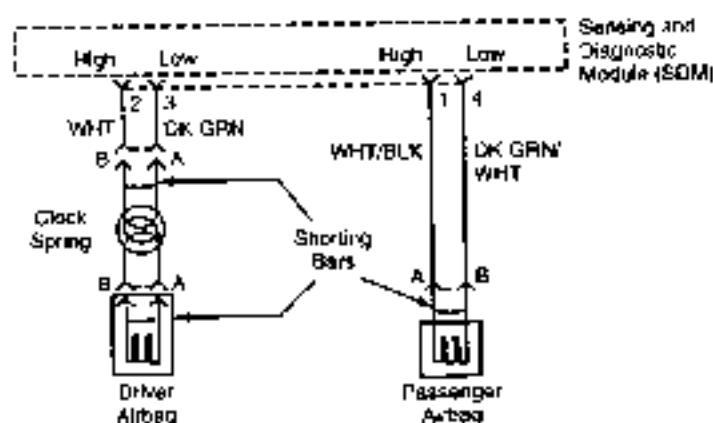
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Connect the scan tool to the assembly line diagnostic link (ALDL) connector. 3. Turn the ignition ON. Is DTC 22 also current?	-	Go to Step 3	Go to Step 4
3	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the yellow airbag connectors at the steering column and at the passenger airbag. 3. Repair the short between the driver airbag high circuit and the passenger airbag high circuit. 4. Make sure all SIR system components are reconnected and all components are properly mounted. Is the repair complete?	-	Go to 'SIR Diagnostic System Check'	-
4	1. Turn the ignition to LOCK and remove the key. 2. Make sure the passenger airbag module yellow two-way connector is seated properly. Is the yellow two-way passenger airbag connector seated properly?	-	Go to Step 6	Go to Step 5
5	1. Seat the passenger airbag yellow two-way connector. 2. Make sure all SIR system components are reconnected and all components are properly mounted. Is the repair complete?	-	Go to 'SIR Diagnostic System Check'	-
6	1. Turn the ignition to LOCK and remove the key. 2. Temporarily disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Check for a short between the passenger high and passenger low circuits (SDM terminals 1 and 4) • Refer to "Diagnostic Illustration 2" in this section. Is there a short between the passenger high and low circuits?	-	Go to Step 7	Go to Step 8

**DTC 16 - Passenger Deployment Loop Resistance Low (Cont'd)**

Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> <li>1. Repair the short between the passenger high circuit and the passenger low circuit.</li> <li>2. Make sure all SIR system components are reconnected and all components are properly mounted.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	Check for a short between the passenger high and driver low circuits. <ul style="list-style-type: none"> <li>• Refer to "Diagnostic Illustration 3" in this section.</li> </ul> Is there a short between the passenger high and driver low circuits (SDM terminals 1 and 3)?	-	Go to Step 9	Go to Step 10
9	<ol style="list-style-type: none"> <li>1. Repair the short between the passenger high circuit and the driver low circuit.</li> <li>2. Make sure all SIR system components are reconnected and all components are properly mounted.</li> <li>3. Command CLEAR CODES with the scan tool.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
10	<ol style="list-style-type: none"> <li>1. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>2. Connect all SIR system components, and ensure that all components are properly mounted.</li> <li>3. Perform the SIR Diagnostic System Check.</li> </ol> Is DTC 16 still current?	-	Go to Step 11	System OK
11	<ol style="list-style-type: none"> <li>1. Disconnect the passenger airbag electrical connector.</li> <li>2. Replace the passenger airbag module.</li> <li>3. Make sure all SIR system components are reconnected and all components are properly mounted.</li> <li>4. Command CLEAR CODES with the scan tool.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 17 PASSENGER DEPLOYMENT LOOP OPEN

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. After passing these tests, Ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Passenger low terminal 4 is grounded through a current sink and the passenger current source is connected to the passenger high terminal to allow a known amount of current to flow. By monitoring the voltage difference between passenger high and passenger low, the SDM calculates the combined resistance of the passenger inflator module, the harness wiring, and the connector terminal contacts.

### DTC 17 Will Set When

The resistance of the passenger deployment loop is above a specified value for 500 milliseconds. The resistance is monitored during the deployment loop continuity test and during continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a diagnostic trouble code (DTC) 17.

### DTC 17 Will Clear When

The resistance of the passenger deployment loop is below a specified value for 500 milliseconds during continuous monitoring.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. See the first caution below.
8. See the cautions below.

### Diagnostic Aids

An intermittent condition is likely to be caused by a poor connection, either at the passenger airbag connector or at terminals 1 and 4 of the SDM. An open wire in the passenger deployment loop will also set DTC 17.

## DTC 17 - Passenger Deployment Loop Open

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

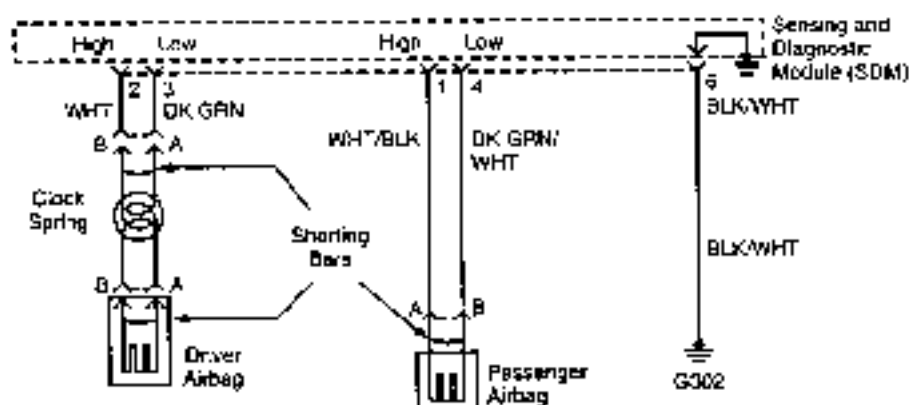
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the passenger airbag connector</li> <li>3. Inspect the terminals for damage or improper connection</li> <li>4. Repair any damaged pins or terminals on the wiring harness side of the connector. If the pigtail or airbag side of the connector is damaged, the passenger airbag must be replaced.</li> <li>5. If no damage was found, re-connect the passenger airbag yellow two-way connector and make sure it is seated properly.</li> <li>6. Turn the ignition ON.</li> </ol> Is DTC still current?	-	Go to Step 3	System OK
3	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key</li> <li>2. Temporarily disconnect the two yellow SIR connectors at the passenger airbag and on the steering column</li> <li>3. Check terminals 1 and 4 at the SDM.</li> </ol> Are there any loose wires or damaged pins or terminals?	-	Go to Step 4	Go to Step 5
4	<ol style="list-style-type: none"> <li>1. Repair any loose or damaged pins or SDM terminals.</li> <li>2. Make sure all SIR system components are re-connected and all components are properly mounted.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
5	Check for an open circuit between the SDM and the passenger airbag connector. • Refer to "Diagnostic Illustration 1" in this section. Is there an open circuit?	-	Go to Step 6	Go to Step 7
6	<ol style="list-style-type: none"> <li>1. Repair the open circuit between the SDM and the passenger inflator module.</li> <li>2. Make sure all SIR system components are re-connected and all components are properly mounted.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

**DTC 17 - Passenger Deployment Loop Open (Cont'd)**

Step	Action	Value(s)	Yes	No
7	1. Replace the SOM. The arrow must be pointing toward the front of the vehicle. 2. Connect all SIR system components, and ensure that all components are properly mounted. 3. Perform the SIR Diagnostic System Check. Is DTC 17 still current?	-	Go to Step 8	System OK
8	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the yellow SIR connector at the passenger airbag. 3. Replace the passenger airbag module. 4. Make sure all SIR system components are reconnected and all components are properly mounted. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 18 PASSENGER DEPLOYMENT LOOP SHORT TO GROUND

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM monitors the voltages at the driver low terminal (terminal 3) and the passenger low terminal (terminal 4) to detect shorts to ground in the deployment loops.

### DTC 18 Will Set When

Diagnostic trouble code (DTC) 18 will be set if the voltage at the passenger low terminal falls below a specified value and ignition 1 is within the normal operating voltage range.

This test is run during turn-on tests and every 100 milliseconds during continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a DTC 18 and also a DTC 71.

### DTC 18 Will Clear When

The malfunction is no longer occurring (has been repaired) and the SDM has been replaced. DTC 18 cannot be cleared with the scan tool.

### Diagnostic Aids

Carefully inspect the wires in the passenger loop for cutting or chafing. If the wiring pigtail of the passenger airbag is damaged, the passenger airbag must be replaced.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. See the first caution below.
4. See the first caution below.
5. See the third caution below.



**DTC 18 - Passenger Deployment Loop Short to Ground**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

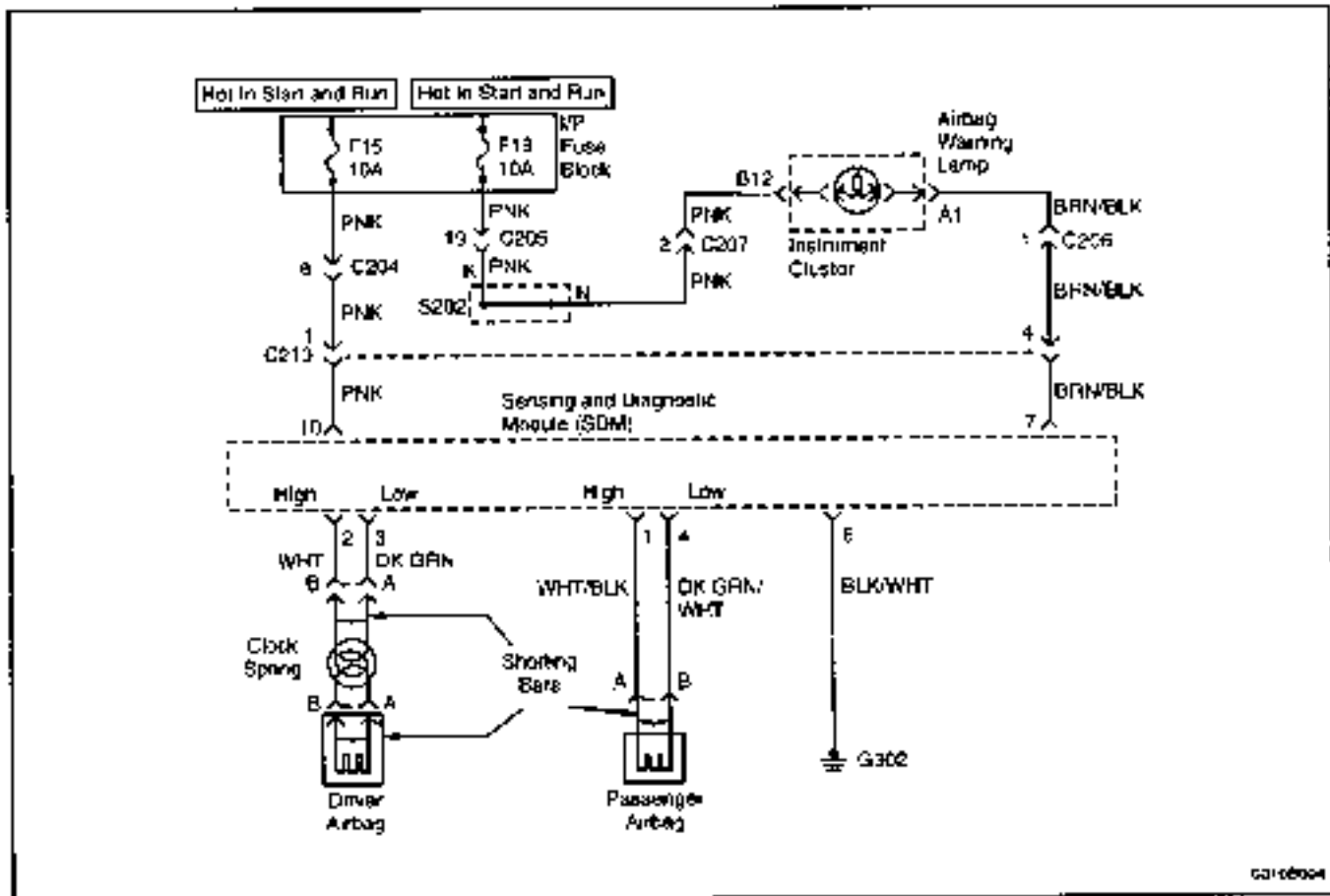
**Important:** A careful inspection of the circuits and components indicated on the DTC 18 chart is essential to ensure that the replacement SDM will not be damaged. When DTC 18 has been set, it is necessary to replace the SDM.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	Visually inspect the wires to the passenger airbag, including the pigtail to the passenger airbag. Is there any evidence of rubbing, damage or chafing?	-	Go to Step 3	Go to Step 4
3	1. Turn the ignition to LOCK and remove the key 2. Temporarily disconnect the passenger airbag and the yellow clock spring connector on the steering column 3. Replace any damaged wiring, terminals, or harnesses. The passenger airbag will require replacement if the pigtail wire harness has been damaged 4. Replace the SDM. The arrow must be pointing to the front of the vehicle. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Turn the ignition OFF 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Disconnect the SDM. 4. Using a digital multimeter, measure resistance at the SDM harness connector between terminal 1 and terminal 6 (ground). ◆ Refer to "Diagnostic Illustration 4" in this section. Is the resistance equal to the specified value?	∞	Go to Step 6	Go to Step 5
5	1. Repair the short to ground between the passenger high circuit and ground. 2. Replace the SDM. The arrow must be pointing to the front of the vehicle. Is the repair complete?	-	Go to Step 6	-
6	1. Disconnect the SDM. 2. Measure the resistance at the SDM connector between terminal 4 and terminal 6 (ground). ◆ Refer to "Diagnostic Illustration 5" in this section. Is the resistance equal to the specified value?	∞	Go to Step 6	Go to Step 7

**DTC 18 - Passenger Deployment Loop Short to Ground (Cont'd)**

Step	Action	Value(s)	Yes	No
7	1. Repair the short to ground between the passenger low circuit and ground. 2. Replace the SDM. The arrow must be pointing to the front of the vehicle. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	1. Replace the passenger airbag. 2. Replace the SDM. The arrow must be pointing to the front of the vehicle. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 19 PASSENGER DEPLOYMENT LOOP SHORT TO VOLTAGE

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM monitors the voltages at the driver low terminal (terminal 3) and the passenger low terminal (terminal 4) to detect shorts to voltage in the deployment loops.

### DTC 19 Will Set When

Diagnostic trouble code 19 will be set if the voltage at the passenger low terminal rises above a specified value while the driver low terminal is below that value and ignition 1 is within the normal operating voltage range. This test is run during turn-on tests and every 100 milliseconds during continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a DTC 19.

### DTC 19 Will Clear When

The voltage measured at the passenger low terminal is below a specified value for 500 milliseconds.

### Diagnostic Aids

An intermittent condition is likely to be caused by a short to voltage in the passenger deployment loop. Carefully inspect the wires in the passenger loop for cutting or chafing. If the wiring pigtail of the passenger airbag is damaged, the passenger airbag must be replaced.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. See the first caution below.
4. See the first caution and the important below.
8. See the cautions below.

## DTC 19 - Passenger Deployment Loop Short to Voltage

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

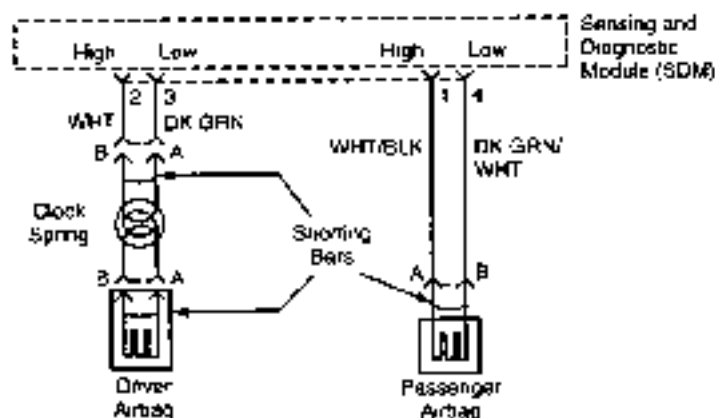
**Important:** Replace any damaged SIR wires. Do not try to repair the wires because a high-resistance connection could make the airbags inoperative and set another DTC.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check Is the SIR Diagnostic System Check complete?	-	Go to Step 2	Go to "SIR Diagnostic System Check"
2	Visually inspect the wires to the passenger airbag, including the pigtail to the passenger airbag. Is there any evidence of rubbing, damage, or chafing?	-	Go to Step 3	Go to Step 4
3	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the driver and passenger airbag modules 3. Replace any damaged wiring, terminals, harnesses, or components. 4. Connect all SIR components and ensure all components are properly mounted Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Disconnect the SDM. 4. Turn the ignition ON. 5. Using a digital multimeter, measure voltage at the SDM harness connector between terminal 1 and terminal 6 (ground). • Refer to "Diagnostic Illustration 6" in this section. Is the voltage below the specified value?	1.0 v	Go to Step 6	Go to Step 5
5	1. Repair the short between the passenger high circuit and voltage 2. Connect all SIR components, and ensure all components are properly mounted. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	1. Disconnect the SDM. 2. Turn the ignition ON. 3. Use a digital multimeter to measure the voltage at the SDM connector between terminal 4 and terminal 6 (ground). • Refer to "Diagnostic Illustration 7" in this section. Is the voltage above the specified value?	1.0 v	Go to Step 7	Go to Step 8

**DTC 19 - Passenger Deployment Loop Short to Voltage (Cont'd)**

Step	Action	Value(s)	Yes	No
7	Repair the short between the passenger low circuit and voltage. Is the repair complete?	-	Go to 'SIR Diagnostic System Check'	-
8	Replace the SDM. Is the repair complete?	-	Go to 'SIR Diagnostic System Check'	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 21 DRIVER DEPLOYMENT LOOP RESISTANCE HIGH

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, ignition 1 and deployment amp voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Driver low terminal 3 is grounded through a current sink, and the driver current source is connected to the driver high terminal 2 to allow a known amount of current to flow. By monitoring the voltage difference between driver high and driver low, the SDM calculates the combined resistance of the driver inflator module, the clock spring, the harness wiring, and the connector terminal contacts.

### DTC 21 Will Set When

The resistance of the driver deployment loop is above a specified value. The test is run once each ignition cycle during the resistance measurement test when

- No higher priority faults are detected when the ignition is turned ON.
- Ignition 1 voltage is above a specified value.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a Diagnostic Trouble Code (DTC) 21.

### DTC 21 Will Clear When

The ignition switch is turned OFF or the scan tool CLEAR CODES command is received.

### Diagnostic Aids

An intermittent condition is likely to be caused by a poor connection from the driver airbag to the clock spring, clock spring to steering column connector, or SDM terminals 2 or 3. The test for this DTC is run only while the AIRBAG indicator is performing the turn-on test. When a scan tool CLEAR CODES command is issued and the malfunction is still present, the DTC will not reappear until the next ignition cycle.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. See the first caution below.
11. See the third caution below.



## DTC 21 - Driver Deployment Loop Resistance High

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

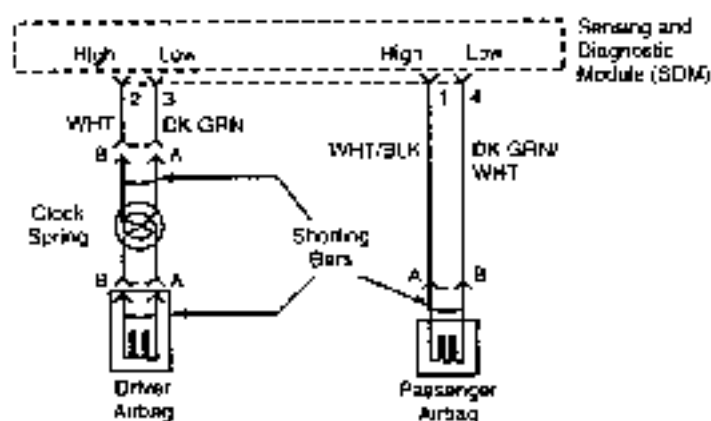
**Important:** Be careful not to spread or deform the terminals of the clock spring connector.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the clock spring yellow connector located on the steering column. 3. Inspect the connector for damage or loose terminals or wires. Is a faulty component, connector, terminal, or wire detected?	-	Go to Step 3	Go to Step 4
3	1. Replace the faulty connector, component, terminal, or wire. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	Disconnect the SDM connector and check terminals 2 and 3 for loose terminals or wires. Is a problem found?	-	Go to Step 5	Go to Step 6
5	1. Replace the loose terminals or wires. 2. Connect all SIR system components. 3. Command CLFAR CODES with the scan tool. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	1. Reconnect the SDM, but leave the yellow clock spring connector disconnected. 2. On the SDM side of the clock spring connector, connect a jumper between the two terminals. • Refer to "Diagnostic Illustration 8" in this section. 3. Turn the ignition ON. Is DTC still present?	-	Go to Step 7	Go to Step 8
7	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the yellow clock spring connector on the steering column. 3. Disconnect the SDM connector. 4. Repair the open circuit between the SDM terminals 2 or 3 and the clock spring connector on the steering column. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

## DTC 21 - Driver Deployment Loop Resistance High (Cont'd)

Step	Action	Value(s)	Yes	No
8	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Connect the clock spring connector on the steering column.</li> <li>3. Disconnect the driver airbag connector.</li> <li>4. Connect a jumper between the two terminals of the clock spring-to-airbag connector.</li> <li>• Refer to "Diagnostic Illustration 9" in this section.</li> <li>5. Turn the ignition ON.</li> </ol> Is DTC 21 still present?	-	Go to Step 9	Go to Step 10
9	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Turn the steering wheel to the straight-ahead position.</li> <li>3. Disconnect the yellow clock spring connector on the steering column.</li> <li>4. Replace the clock spring.</li> <li>5. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
10	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the yellow clock spring connector on the steering column.</li> <li>3. Replace the driver airbag.</li> <li>4. Connect all SIR system components.</li> <li>5. Turn the ignition ON.</li> </ol> Is DTC 21 still present?	-	Go to Step 11	System OK
11	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the the yellow clock spring connector on the steering column.</li> <li>3. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>4. Connect all SIR system components, and ensure that all components are properly mounted.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 22 DRIVER DEPLOYMENT LOOP RESISTANCE LOW

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Driver low terminal 3 is grounded through a current sink, and the driver current source is connected to the driver high terminal 2 to allow a known amount of current to flow. By monitoring the voltage difference between driver high and driver low, the SDM calculates the combined resistance of the driver inflator module, the clock spring, the harness wiring, and the connector terminal contacts.

### DTC 22 Will Set When

The resistance of the driver deployment loop is below a specified value. The test is run once each ignition cycle during the resistance measurement test when

- No higher priority faults are detected when the ignition is turned ON.
- Ignition 1 voltage is below a specified value.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a diagnostic trouble code (DTC) 22.

### DTC 22 Will Clear When

The ignition switch is turned OFF or the scan tool CLEAR CODES command is received.

### Diagnostic Aids

An intermittent condition is likely to be caused by a short between driver high and driver low or between driver high and passenger low. This condition could also be caused by a faulty clock spring or a faulty shorting bar in the clock spring steering column connector. The test for this DTC is run only while the AIRBAG indicator is performing the turn-on test. When a scan tool CLEAR CODES command is issued and the malfunction is still present, the DTC will not reappear until the next ignition cycle.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. See the first caution below.
15. See the third caution below.

## DTC 22 - Driver Deployment Loop Resistance Low

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

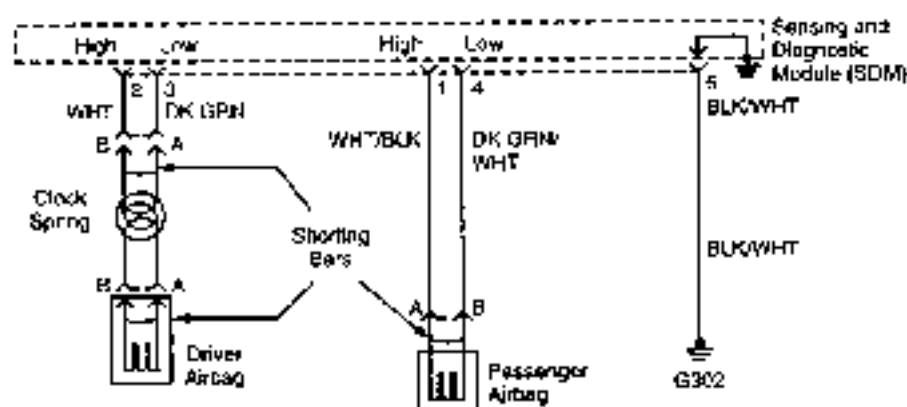
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	Check for additional current DTCs. Is DTC 16 also current?	-	Go to Step 3	Go to Step 4
3	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Repair the short from driver high to passenger high. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Disconnect the clock spring yellow two-way connector located on the steering column. 2. Inspect the connector for damage. Is a faulty component, connector, terminal, or wire detected?	-	Go to Step 5	Go to Step 6
5	1. Replace the faulty connector, component, terminal or wire. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	Visually check the SDM connector terminals 2 and 3 for shorted terminals or wires. Is a problem found?	-	Go to Step 7	Go to Step 8
7	1. Replace the shorted terminals or wires. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	With the SDM disconnected, use an ohmmeter to check the SDM harness connector for a short between terminal 2 (driver high) and terminal 4 (passenger low). • Refer to "Diagnostic Illustration 10" in this section. Is there a short between driver high and passenger low?	0 $\Omega$	Go to Step 9	Go to Step 10
9	1. Repair the short circuit. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

## DTC 22 - Driver Deployment Loop Resistance Low (Cont'd)

Step	Action	Value(s)	Yes	No
10	1. Remove the driver airbag. 2. Reconnect the yellow clock spring connector on the steering column. 3. At the SDM connector, use an ohmmeter to check for a short between the driver high (terminal 2) and driver low (terminal 3). • Refer to "Diagnostic Illustration 11" in this section. Is there a short circuit between the driver high and driver low circuits?	0 Ω	Go to Step 12	Go to Step 11
11	1. Replace the driver airbag. 2. Connect all SIR system components. 3. Perform the Diagnostic System Check. Is DTC 22 still current?	-	Go to Step 15	System OK
12	1. Disconnect the yellow clock spring connector on the steering column. 2. At the SDM connector, use an ohmmeter to check for a short between the driver high (terminal 2) and driver low (terminal 3). • Refer to "Diagnostic Illustration 11" in this section. Is there a short circuit between the driver high and driver low circuits?	0 Ω	Go to Step 14	Go to Step 13
13	1. Turn the steering wheel to the straight-ahead position. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the clock spring. 4. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
14	Repair the shorted driver high and driver low wires between the SDM and the clock spring. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
15	1. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 2. Connect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 24 DRIVER DEPLOYMENT LOOP SHORT TO GROUND

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM monitors the voltages at the driver low (terminal 3) and passenger low (terminal 4) to detect shorts to ground in the deployment loops.

### DTC 24 Will Set When

DTC 24 will be set if the voltage at driver low falls below a specified value, and Ignition 1 is within the normal operating voltage range.

This test is run during turn-on tests and every 100 milliseconds during continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a diagnostic trouble code 24. DTC 71 will also set.

### DTC 24 Will Clear When

The malfunction is no longer occurring (has been repaired) and the SDM has been replaced. DTC 24 cannot be cleared with the scan tool.

### Diagnostic Aids

Carefully inspect the wires in the driver loop for cutting or chafing.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. See the first caution below.
11. See the third caution below.



## DTC 24 - Driver Deployment Loop Short to Ground

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the Sift system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR System. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

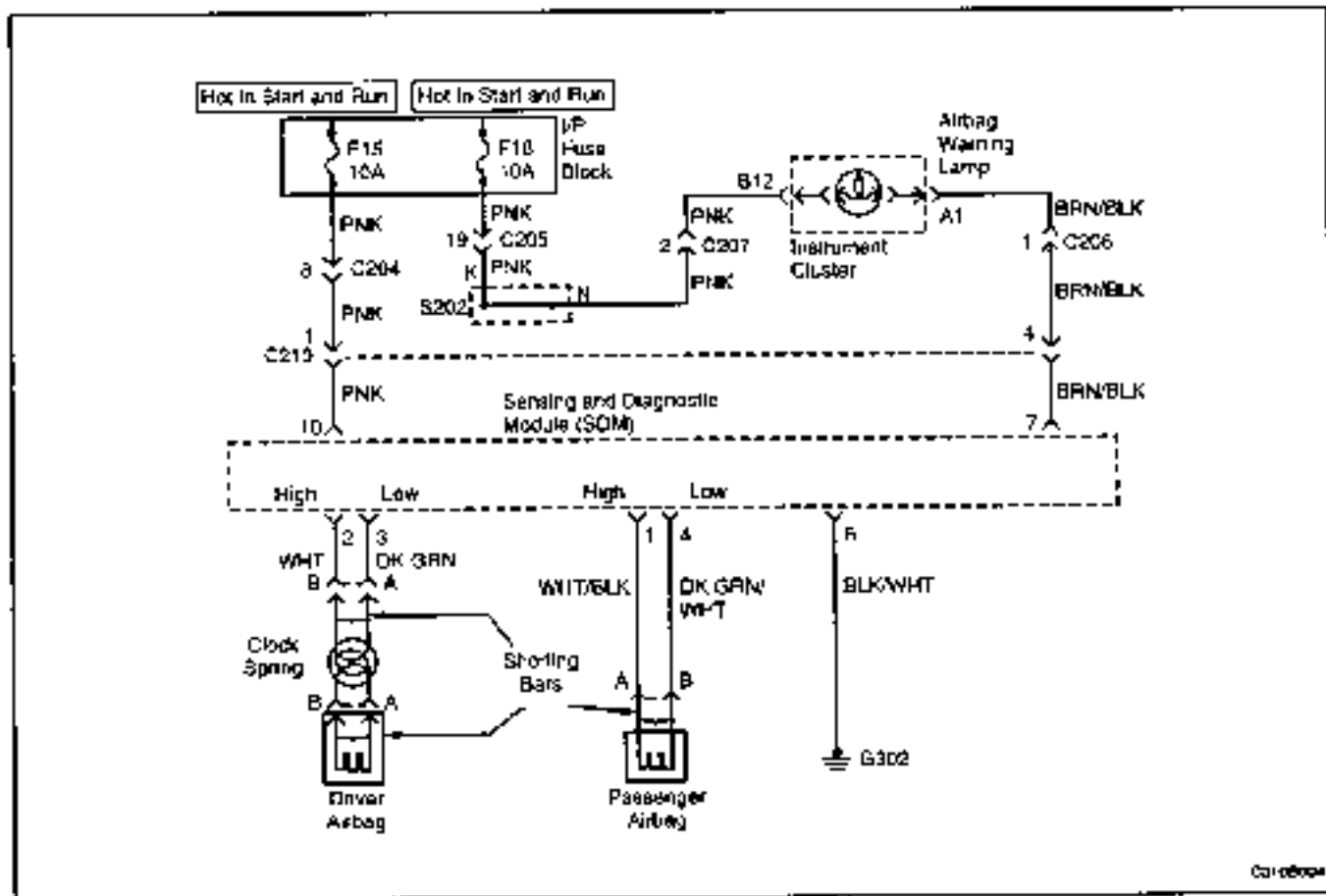
**Important:** A careful inspection of the circuits and components indicated on the DTC 24 chart is essential to ensure that the replacement SDM will not be damaged. When DTC 24 has been set, it is necessary to replace the SDM.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the driver and passenger airbags, or wait 10 minutes before proceeding. 3. Visually inspect the driver airbag circuit and connectors, especially at the SDM. Is there any evidence of rubbing, damage, or chafing?	-	Go to Step 3	Go to Step 4
3	1. Repair the damaged wires or connectors. 2. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 3. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Disconnect the yellow clock spring connector on the steering column if it was not previously disconnected. 2. At the SDM connector, use an ohmmeter to check for a short between the driver high (terminal 2) and terminal 6 (ground). • Refer to "Diagnostic Illustration 12" in this section. Is the resistance equal to the specified value?	$\infty$	Go to Step 6	Go to Step 5
5	1. Repair the short to ground in the driver high circuit between the clock spring connector and the SDM. 2. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 3. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	Measure the resistance at the SDM connector between terminal 3 and terminal 6 (ground). • Refer to "Diagnostic Illustration 13" in this section. Is the resistance equal to the specified value?	$\infty$	Go to Step 8	Go to Step 7

## DTC 24 - Driver Deployment Loop Short to Ground (Cont'd)

Step	Action	Value(s)	Yes	No
7	<ol style="list-style-type: none"> <li>1. Repair the short to ground in the driver low circuit between the SDM and the clock spring connector.</li> <li>2. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>3. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	<ol style="list-style-type: none"> <li>1. Temporarily remove the driver airbag.</li> <li>2. Re-connect the yellow clock spring connector on the steering column.</li> <li>3. At the SDM connector, use an ohmmeter to check for a short between the driver high (terminal 2) and terminal 6 (ground).</li> </ol> • Refer to "Diagnostic Illustration 12" in this section. Is the resistance equal to the specified value?	∞	Go to Step 10	Go to Step 9
9	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key</li> <li>2. Turn the steering wheel to the straight-ahead position.</li> <li>3. Disconnect the yellow clock spring connector on the steering column</li> <li>4. Replace the clock spring.</li> <li>5. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>6. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
10	Measure the resistance at the SDM connector between terminal 3 and terminal 6 (ground). • Refer to "Diagnostic Illustration 13" in this section. Is the resistance equal to the specified value?	∞	Go to Step 11	Go to Step 9
11	<ol style="list-style-type: none"> <li>1. Disconnect the yellow clock spring connector on the steering column.</li> <li>2. Replace the driver airbag.</li> <li>3. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>4. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 25 DRIVER DEPLOYMENT LOOP SHORT TO VOLTAGE

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, Ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM monitors the voltages at the driver low (terminal 3) and passenger low (terminal 4) to detect shorts to voltage in the deployment loops.

### DTC 25 Will Set When

DTC 25 will be set if the driver low is above 5 volts for 500 milliseconds while the passenger low is below 5 volts, and Ignition 1 is within the normal operating voltage range. The test is run during turn-on tests and every 100 milliseconds during continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a diagnostic trouble code (DTC) 25.

### DTC 25 Will Clear When

The voltage measured at driver low is below 4 volts for 500 milliseconds or the ignition is turned OFF.

### Diagnostic Aids

Carefully inspect the wires in the driver loop for cutting or chafing.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

- 2 See the first caution below.
- 11 See the third caution below.

## DTC 25 - Driver Deployment Loop Short to Voltage

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

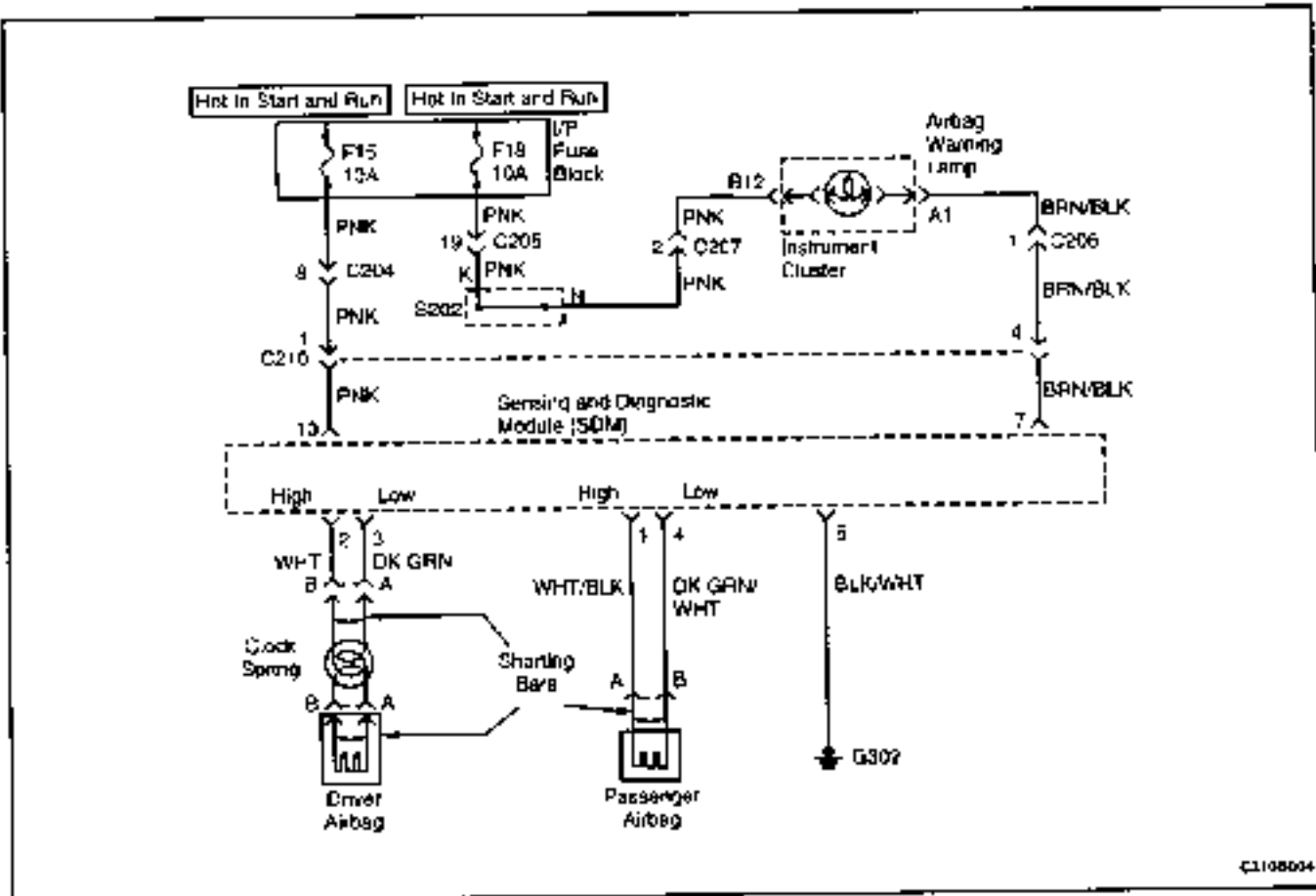
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the driver and passenger airbags, or wait 10 minutes before proceeding. 3. Visually inspect the driver airbag circuit and connectors, especially at the SDM. Is there any evidence of rubbing, damage, or chafing?	-	Go to Step 3	Go to Step 4
3	1. Repair the damaged wires or connectors. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Disconnect the yellow clock spring connector on the steering column if it was not previously disconnected. 2. At the SDM connector, use an multimeter to check voltage between the driver high (terminal 2) and terminal 6 (ground). ◆ Refer to "Diagnostic Illustration 14" in this section. Is the voltage greater than the specified value?	5 v	Go to Step 5	Go to Step 6
5	1. Repair the short to voltage in the driver high circuit between the clock spring connector and the SDM. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	Measure the voltage at the SDM connector between terminal 3 and terminal 6 (ground). ◆ Refer to "Diagnostic Illustration 15" in this section. Is the voltage greater than the specified value?	5 v	Go to Step 7	Go to Step 8
7	1. Repair the short to voltage in the driver low circuit between the SDM and the clock spring connector. 2. Connect all SIR system components. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

## DTC 25 – Driver Deployment Loop Short to Voltage (Cont'd)

Step	Action	Value(s)	Yes	No
8	<ol style="list-style-type: none"> <li>1. Temporarily remove the driver airbag.</li> <li>2. Re-connect the yellow clock spring connector on the steering column.</li> <li>3. At the SDM connector, use a multimeter to check voltage between the driver high (terminal 2) and terminal 6 (ground). <ul style="list-style-type: none"> <li>• Refer to "Diagnostic Illustration 14" in this section.</li> </ul> </li> </ol> Is the voltage greater than the specified value?	5 v	Go to Step 9	Go to Step 10
9	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Turn the steering wheel to the straight-ahead position.</li> <li>3. Disconnect the yellow clock spring connector on the steering column.</li> <li>4. Replace the clock spring.</li> <li>5. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
10	Measure the voltage at the SDM connector between terminal 3 and terminal 6 (ground). <ul style="list-style-type: none"> <li>• Refer to "Diagnostic Illustration 15" in this section.</li> </ul> Is the voltage greater than the specified value?	5 v	Go to Step 9	Go to Step 11
11	<ol style="list-style-type: none"> <li>1. Disconnect the yellow clock spring connector on the steering column.</li> <li>2. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>3. Connect all SIR system components.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 26 DRIVER DEPLOYMENT LOOP OPEN

### Circuit Description

When the ignition switch is turned to ON, the sensing and diagnostic module (SDM) will perform tests to diagnose critical malfunctions within itself. Upon passing these tests, Ignition 1 and deployment loop voltages are measured to ensure that they are within their respective normal voltage ranges. The SDM then proceeds with the resistance measurement test. Driver low terminal 4 is grounded through a current sink, and the driver current source is connected to the driver high terminal to a low known amount of current to flow. By monitoring the voltage difference between driver high and driver low, the SDM calculates the combined resistance of the driver inflator module, the harness wiring, and the connector terminal contacts.

### DTC 26 Will Set When

The resistance of the driver deployment loop is above a specified value for 500 milliseconds. The resistance is monitored during the deployment loop continuity test and continuous monitoring.

### Action Taken

The SDM will turn on the AIRBAG indicator and set a diagnostic trouble code (DTC) 26.

### DTC 26 Will Clear When

The voltage measured at driver low is below a specified value for 500 milliseconds or the ignition is turned OFF.

### Diagnostic Aids

An intermittent condition is likely to be caused by a poor connection, either at the driver airbag or clock spring connectors or SDM terminals 2 and 3. An open wire in the driver deployment loop will also set DTC 26. To test for a faulty SIR clock spring, clear the DTCs, then turn the steering wheel back and forth with the ignition switch ON. If the AIRBAG indicator comes on and DTC 26 has set again, it is likely that the clock spring is faulty.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

- 4. This test establishes that the problem is either in the clock spring or the driver airbag.
- 7. See the important below.
- 10. See the first caution below.
- 14. See the third caution below.



## DTC 26 - Driver Deployment Loop Open

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** Never measure the resistance of an inflator module with an ohmmeter. The ohmmeter battery could unexpectedly deploy the airbag which would create the possibility of severe injury and would require the replacement of otherwise useable components.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

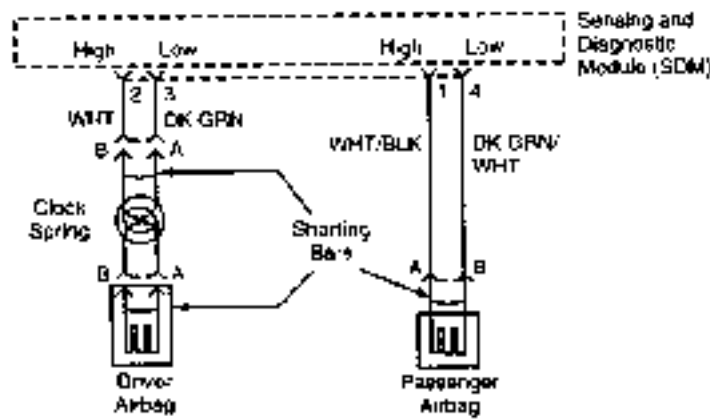
**Important:** Avoid deforming the terminals of the clock spring-to-airbag connector.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Make sure the clock spring yellow two-way connector (located on the steering column) is seated properly. Is the yellow clock spring connector seated properly?	-	Go to Step 4	Go to Step 3
3	1. Seat the clock spring yellow two-way connector. 2. Make sure all SIR system components are reconnected and all components are properly mounted. 3. Turn the ignition ON. Is DTC 26 still current?	-	Go to Step 4	Go to "SIR Diagnostic System Check"
4	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the yellow clock spring connector on the steering column. 3. Connect a jumper between the terminals on the SDM side of the clock spring connector. • Refer to "Diagnostic Illustration 8" in this section. 4. Turn the ignition ON. Is DTC 26 still current?	-	Go to Step 9	Go to Step 5
5	1. Turn the ignition to LOCK and remove the key. 2. Examine the connection at the driver airbag. Is the driver airbag connector seated properly?	-	Go to Step 7	Go to Step 6
6	1. Properly seat the connector to the driver airbag. 2. Re-connect the yellow clock spring connector on the lower steering column. 3. Turn the ignition ON. Is DTC 26 still current?	-	Go to Step 7	Go to "SIR Diagnostic System Check"
7	1. Turn the ignition to LOCK and remove the key. 2. Temporarily remove the driver airbag. 3. Connect a jumper between the terminals of the clock spring-to-driver airbag connector. • Refer to "Diagnostic Illustration 9" in this section. 4. Turn the ignition ON. 5. Move the steering wheel back and forth while watching the AIRBAG indicator. Did the AIRBAG indicator turn on with DTC 26 still current?	-	Go to Step 9	Go to Step 8

## DTC 26 - Driver Deployment Loop Open (Cont'd)

Step	Action	Value(s)	Yes	No
8	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the yellow clock spring connector on the steering column.</li> <li>3. Replace the driver airbag.</li> <li>4. Connect all SIR system components and the scan tool.</li> <li>5. Turn the ignition ON.</li> </ol> Is DTC 26 still current?	-	Go to Step 1	Go to "SIR Diagnostic System Check"
9	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Turn the steering wheel to the straight-ahead position.</li> <li>3. Disconnect the yellow clock spring connector on the steering column.</li> <li>4. Replace the clock spring.</li> <li>5. Connect all SIR system components and the scan tool.</li> <li>6. Turn the ignition ON.</li> </ol> Is DTC 26 still current?	-	Go to Step 1	Go to Step 10
10	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column.</li> <li>3. Disconnect the SDM connector.</li> <li>4. Examine the pins and terminals at the SDM terminals 2 and 3.</li> </ol> Are there any loose wires or backed-nut terminals?	-	Go to Step 11	Go to Step 12
11	<ol style="list-style-type: none"> <li>1. Repair any loose wires or damaged pins or terminals.</li> <li>2. Connect all SIR system components and the scan tool.</li> <li>3. Turn the ignition ON.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
12	Use an ohmmeter to check both driver deployment wires for an open circuit between the SDM connector (terminals 2 and 3) and the clock spring connector. <ul style="list-style-type: none"> <li>• Refer to "Diagnostic Illustration 16" in this section.</li> </ul> Does the ohmmeter show the specified value?	$\infty$	Go to Step 13	Go to Step 14
13	<ol style="list-style-type: none"> <li>1. Replace any open wires between the SDM and the clock spring.</li> <li>2. Connect all SIR system components and the scan tool.</li> <li>3. Turn the ignition ON.</li> </ol> Is DTC 26 still current?	-	Go to Step 14	-
14	<ol style="list-style-type: none"> <li>1. Turn the ignition to LOCK and remove the key.</li> <li>2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column.</li> <li>3. Replace the SDM. The arrow must be pointing toward the front of the vehicle.</li> <li>4. Connect all SIR system components, and ensure that all components are properly mounted.</li> <li>5. Command CLEAR CODES with the scan tool.</li> </ol> Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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B-1108002

## DIAGNOSTIC TROUBLE CODE (DTC) 51 DEPLOYMENT COMMANDED

### Circuit Description

The sensing and diagnostic module (SDM) contains a sensing device which converts vehicle velocity changes to an electrical signal. The electrical signal generated is processed by the SDM and then compared to a value stored in memory. When the generated signal exceeds the stored value, additional signal processing is performed and the generated signals are compared to signals stored in memory. When one of the generated signals exceed the stored values, the SDM will cause sufficient current to flow through the inflator modules to deploy the air bags and cause DTC 51 to be set.

### DTC 51 Will Set When

The SDM detects a frontal crash within 30 degrees of the centerline of the vehicle, of sufficient force to warrant deployment of the air bags.

### Action Taken

The SDM turns on the AIRBAG indicator, records crash data, and sets a DTC 51.

### DTC 51 Will Clear When

The SDM is replaced. This code cannot be cleared with a scan tool.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. If there is no evidence of impact, DTC may have been set falsely.
5. See the cautions below.

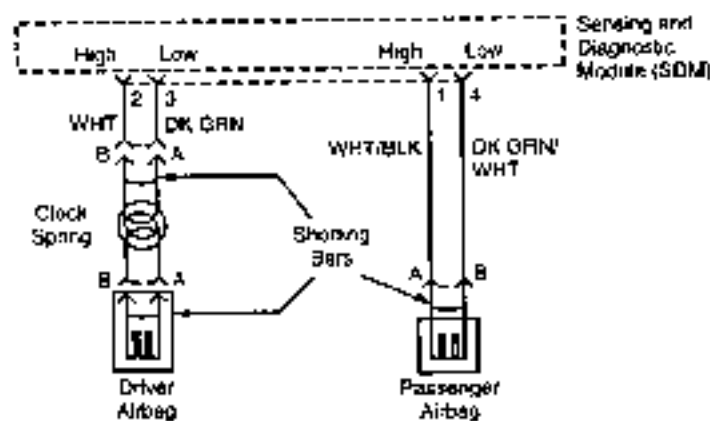
**DTC 51 - Deployment Commanded**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Check for deployed airbags. Have the airbags deployed?	-	Go to Step 3	Go to Step 4
3	1. Remove the airbag fuse. 2. Turn the steering wheel to the straight-ahead position. 3. Perform inspections and replace components as directed in "Repairs and Inspections Required After An Accident" in this section. 4. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 5. Connect all SIR system components, and ensure that all components are properly mounted. 6. Reinstall the airbag fuse. 7. Use a scan tool to clear SIR trouble codes. Are the repairs complete?	-	Go to "SIR Diagnostic System Check"	-
4	Inspect the front of the vehicle and undercarriage for signs of impact. Are there any signs of impact?	-	Go to Step 3	Go to Step 5
5	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Connect all SIR system components, and ensure that all components are properly mounted. Are the repairs complete?	-	Go to "SIR Diagnostic System Check"	-



81108005

## DIAGNOSTIC TROUBLE CODE (DTC) 53 DEPLOYMENT COMMANDED WITH LOOP FAULTS PRESENT

### Circuit Description

The sensing and diagnostic module (SDM) contains a sensing device which converts vehicle velocity changes to an electrical signal. The electrical signal generated is processed by the SDM and then compared to a value stored in memory. When the generated signal exceeds the stored value, additional signal processing is performed and the generated signals are compared to signals stored in memory. When two of the generated signals exceed the stored values, the SDM will cause sufficient current to flow through the inflator modules to deploy the air bags. DTC 53 is set instead of DTC 51 when a deployment occurs while an inflator circuit fault is present that could possibly result in a no deployment situation in one or both inflator modules.

### DTC 53 Will Set When

- The SDM detects a frontal crash within 30 degrees from the centerline of the vehicle, of sufficient force to warrant deployment of the air bags.
- An inflator circuit fault is present.

### Action Taken

The SDM turns ON the AIRBAG indicator, records crash data, and sets a DTC 53.

### DTC 53 Will Clear When

The SDM is replaced. This code cannot be cleared with a scan tool.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. If there is no evidence of impact, DTC may have been set falsely.
5. See the cautions below.

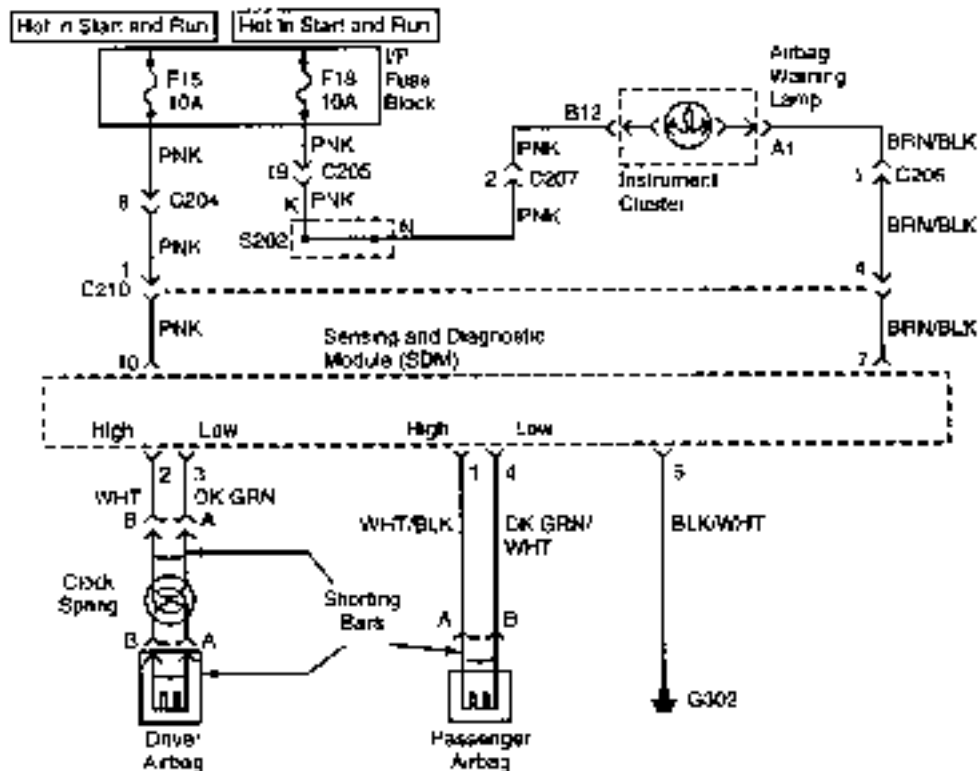
## DTC 53 Deployment Commanded With Loop Faults Present

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	1. Turn the ignition to LOCK and remove the key. 2. Check for deployed airbags. Have the airbags deployed?	-	Go to Step 3	Go to Step 4
3	1. Remove the airbag fuse. 2. Turn the steering wheel to the straight-ahead position. 3. Perform inspections and replace components as directed in "Repairs and Inspections Required After an Accident" in this section. 4. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 5. Connect all SIR system components, and ensure that all components are properly mounted. 6. Reinstall the airbag fuse. 7. Use a scan tool to clear SIR trouble codes. Are the repairs complete?	-	Go to "SIR Diagnostic System Check"	-
4	Inspect the front of the vehicle and undercarriage for signs of impact. Are there any signs of impact?	-	Go to Step 3	Go to Step 5
5	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Connect all SIR system components, and ensure that all components are properly mounted. Are the repairs complete?	-	Go to "SIR Diagnostic System Check"	-



### DIAGNOSTIC TROUBLE CODE (DTC) 61 AIRBAG WARNING LAMP CIRCUIT OPEN

**Circuit Description**

When the Ignition switch is first turned ON, ignition 1 voltage is applied to the indicator lamp and also to the sensing and diagnostic module (SDM) input terminal 10. The SDM responds by flashing the instrument cluster AIRBAG indicator seven times. If the SDM cannot detect voltage on the indicator circuit, a DTC 61 will be set. The SDM also attempts to turn on the AIRBAG indicator, but the indicator will not turn on if inputs have been correctly processed.

**DTC 61 Will Set When**

Either during the turn on test or during continuous monitoring, the SDM fails to detect voltage at terminal 7, the input terminal for the AIRBAG indicator.

**Action Taken**

The SDM attempts to turn on the AIRBAG indicator, and it sets a DTC 61.

**DTC 61 Will Clear When**

The ignition switch is turned OFF or the problem is repaired.

**Test Description**

The number(s) below refer to step(s) on the diagnostic table.

- 12. See the first caution below.
- 14. See the cautions below.



## DTC 61 - AIRBAG Warning Lamp Circuit Open

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM.

Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	Check the instrument panel fuse F18. Is fuse F18 blown?	-	Go to Step 3	Go to Step 4
3	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
4	1. Turn the ignition ON. 2. Check the power supply to fuse F18. Is the voltage equal to the specified value?	11-14 v	Go to Step 6	Go to Step 5
5	Repair the power supply to fuse F18. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
6	1. Remove the instrument cluster. 2. Check the AIRBAG indicator bulb. Is the bulb in good condition?	-	Go to Step 8	Go to Step 7
7	Replace the AIRBAG indicator bulb. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
8	1. Turn the ignition ON. 2. Check the voltage at instrument cluster connector B12. Is the voltage at B12 equal to the specified value?	11-14 v	Go to Step 10	Go to Step 9
9	Repair the open circuit between the instrument panel fuse F18 and instrument cluster connector B6. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
10	Test the instrument cluster printed circuit for continuity between connectors B12 and A1. Is there continuity between B12 and A1 on the printed circuit?	-	Go to Step 12	Go to Step 11
11	Replace the instrument cluster. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
12	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Disconnect the SDM electrical connector. 4. Turn the ignition ON. 5. Check the voltage at terminal 7 of the SDM connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 14	Go to Step 13

## DTC 51 - AIRBAG Warning Lamp Circuit Open (Cont'd)

Step	Action	Value(s)	Yes	No
13	Repair the open circuit between the instrument cluster and the SDM connector terminal 7. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-
14	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Connect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-

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## DIAGNOSTIC TROUBLE CODE (DTC) 71 INTERNAL SENSING AND DIAGNOSTIC MODULE (SDM) FAILURE

### Circuit Description

DTC 71 is an indication of a potential internal SDM malfunction and will set if any of the following conditions is detected:

- Reserve voltage discharge time has failed for three consecutive ignition cycles.
- The calculated checksum for internal memory does not match the stored value.
- The temporary memory storage area is malfunctioning.
- The permanent memory storage area is malfunctioning.
- The voltage measured at driver low and passenger low are too high.
- The voltage measured at driver low and passenger low are too low.
- The accelerometer inside the SDM is malfunctioning.
- The driver current source and/or passenger current source is malfunctioning.
- The SDM is unable to read from or write to electronically erasable programmable read-only memory (EEPROM).
- The arming sensor inside the SDM is not closed during a deployment event.

### DTC 71 Will Set When

Any of the indicated malfunctions is detected by the SDM. The malfunctions are detected at various times:

- Turn-on.
- Continuous monitoring.
- Resistance measurement test.

### Action Taken

The SDM turns on the AIRBAG indicator and sets a DTC 71.

### DTC 71 Will Clear When

A scan tool CLEAR CODES command is received by the SDM. Some of the malfunctions will allow the AIRBAG indicator to turn off only briefly and then turn on again.

### Test Description

The number(s) below refer to step(s) on the diagnostic table.

- ①. See the cautions below.

**DTC 71 - Internal Sensing and Diagnostic Module (SDM) Failure**

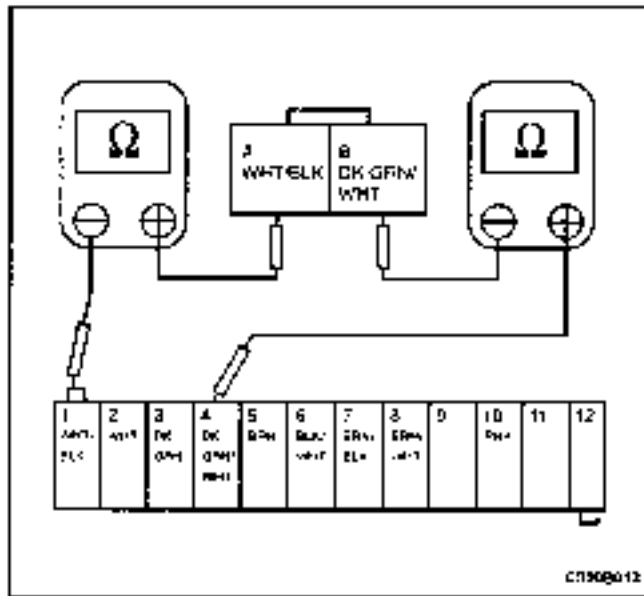
**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM.

**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM

arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered when it is not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

**Important:** Codes 18, 24, and 71 cannot be reset if there has been a short to ground in the deployment loops. When DTC 18 or 24 has been set, it is necessary to replace the SDM. To avoid damaging the replacement SDM, ensure that the short to ground is repaired prior to installing a replacement SDM.

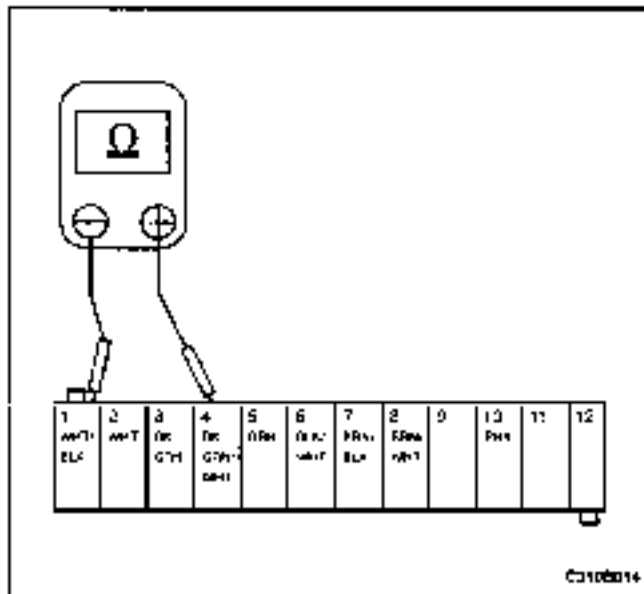
Step	Action	Value(s)	Yes	No
1	Perform the SIR Diagnostic System Check. Is the SIR Diagnostic System Check complete?	-	Go to Step 2	-
2	Check for current or history DTCs. Is either DTC 18 or DTC 24 also set as a current or a history DTC?	-	Go to the diagnostic table for DTC 18 or DTC 24	Go to Step 3
3	1. Turn the ignition to LOCK and remove the key. 2. Disconnect the passenger airbag and the yellow clock spring connector on the steering column. 3. Replace the SDM. The arrow must be pointing toward the front of the vehicle. 4. Connect all SIR system components, and ensure that all components are properly mounted. Is the repair complete?	-	Go to "SIR Diagnostic System Check"	-



**Caution:** Do not use these illustrations to troubleshoot without consulting the diagnostic trouble code (DTC) charts. The DTC charts give additional safety precautions and detailed instructions for each test. Failure to follow the proper precautions can result in injury from unintended airbag deployment.

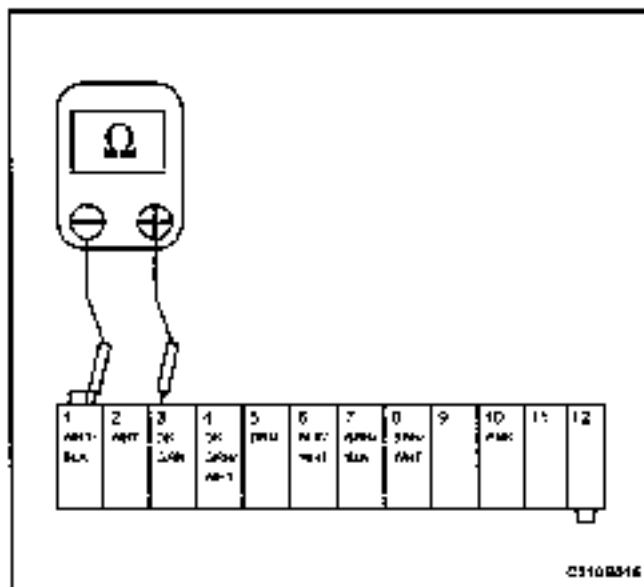
### DIAGNOSTIC ILLUSTRATION 1

Checking the continuity between the passenger airbag and the sensing and diagnostic module (SDM).



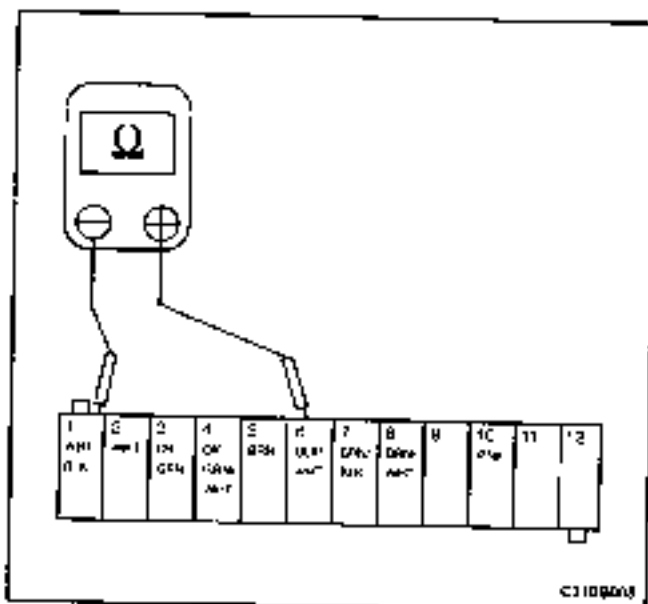
### DIAGNOSTIC ILLUSTRATION 2

Checking for a short circuit between the passenger high and low circuits.



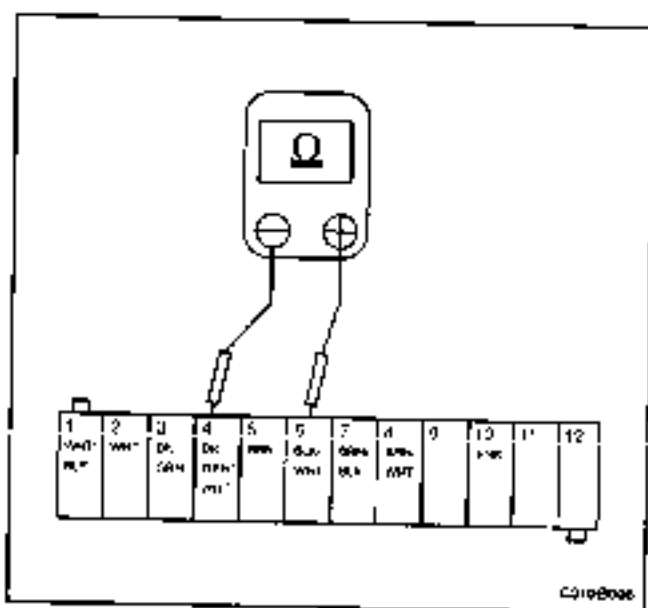
### DIAGNOSTIC ILLUSTRATION 3

Checking for a short circuit between the passenger high and driver low circuits.



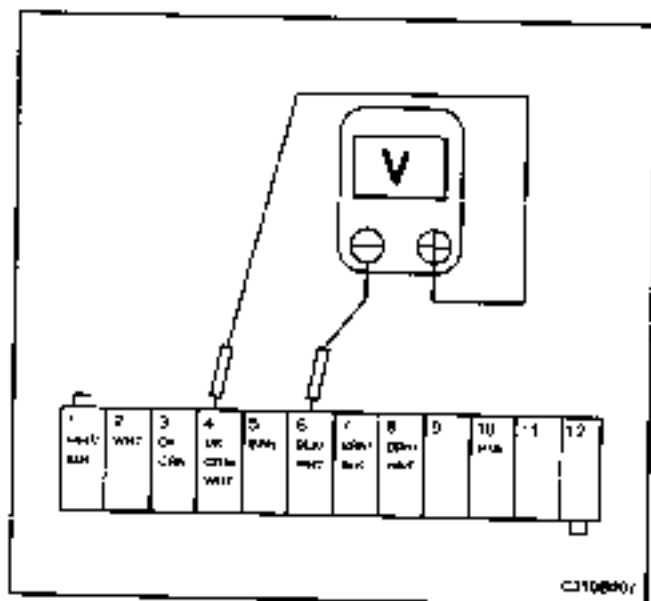
#### DIAGNOSTIC ILLUSTRATION 4

Checking for a short circuit between the passenger high circuit and ground



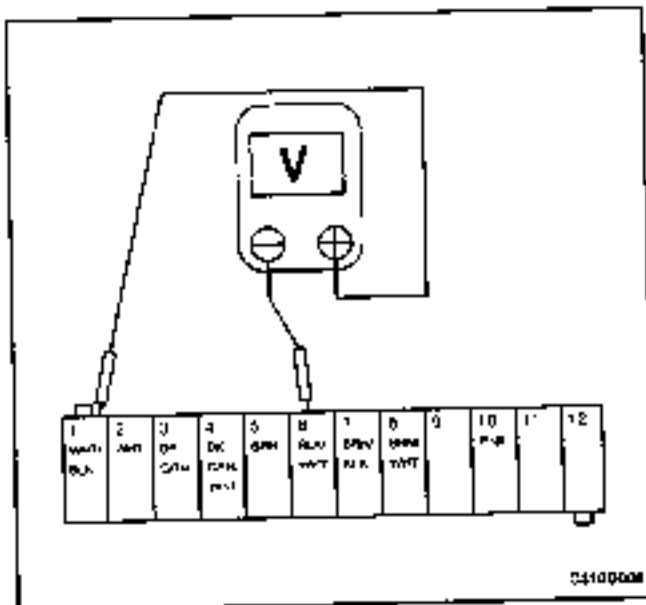
#### DIAGNOSTIC ILLUSTRATION 5

Checking for a short circuit between the passenger low circuit and ground.



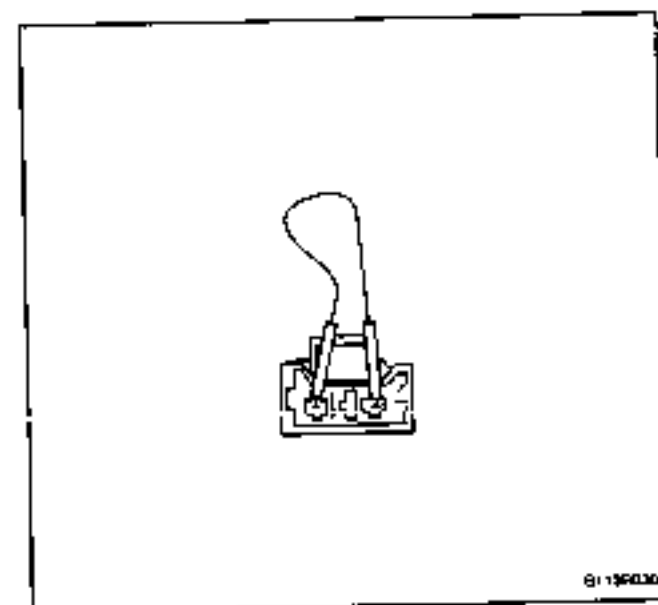
#### DIAGNOSTIC ILLUSTRATION 6

Checking for a short circuit between the passenger high circuit and voltage



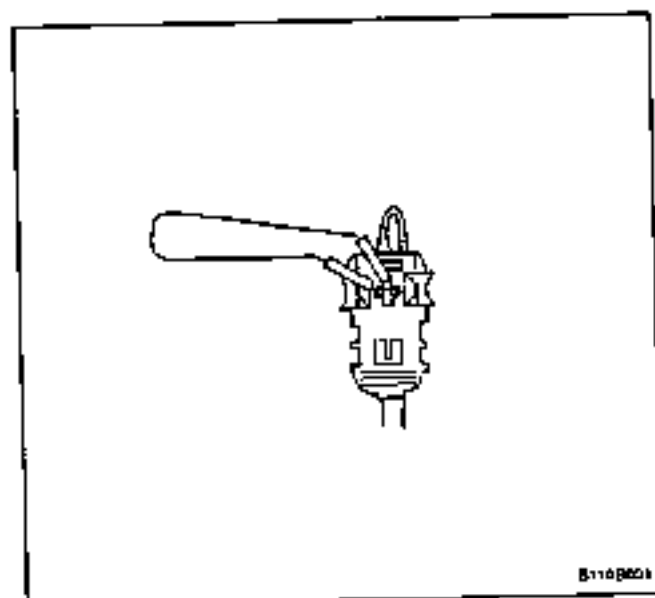
### DIAGNOSTIC ILLUSTRATION 7

Checking for a short circuit between the passenger low circuit and voltage.



### DIAGNOSTIC ILLUSTRATION 8

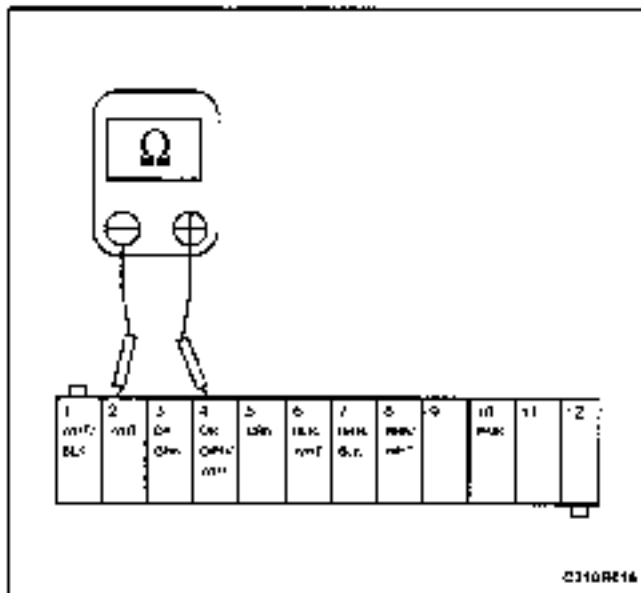
Placing a jumper on the SDM side of the yellow clock spring connector.



### DIAGNOSTIC ILLUSTRATION 9

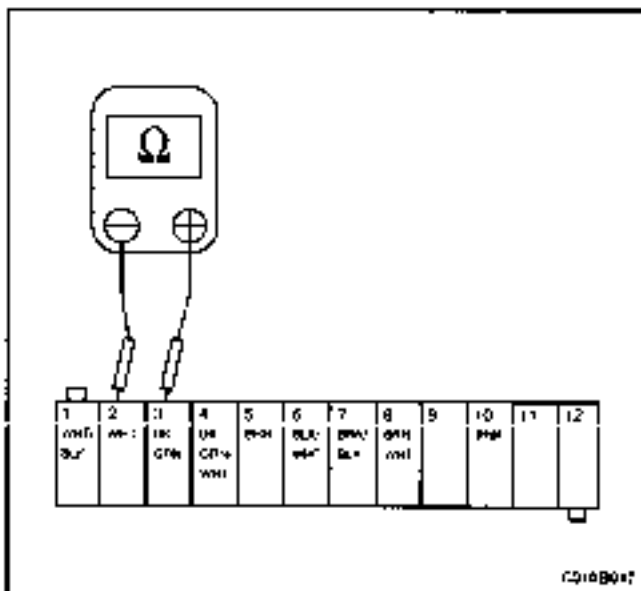
Placing a jumper on the clock spring-to-airbag connector.





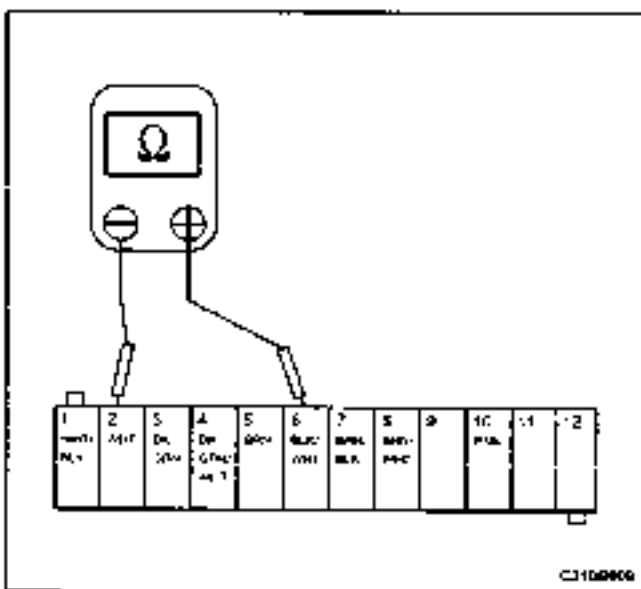
### DIAGNOSTIC ILLUSTRATION 10

Checking for a short circuit between the driver high and passenger low circuits.



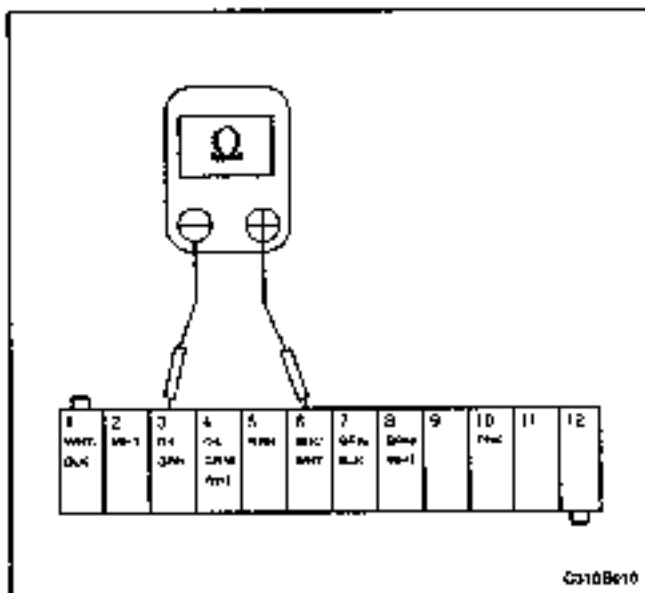
### DIAGNOSTIC ILLUSTRATION 11

Checking for a short circuit between the driver high and driver low circuits.



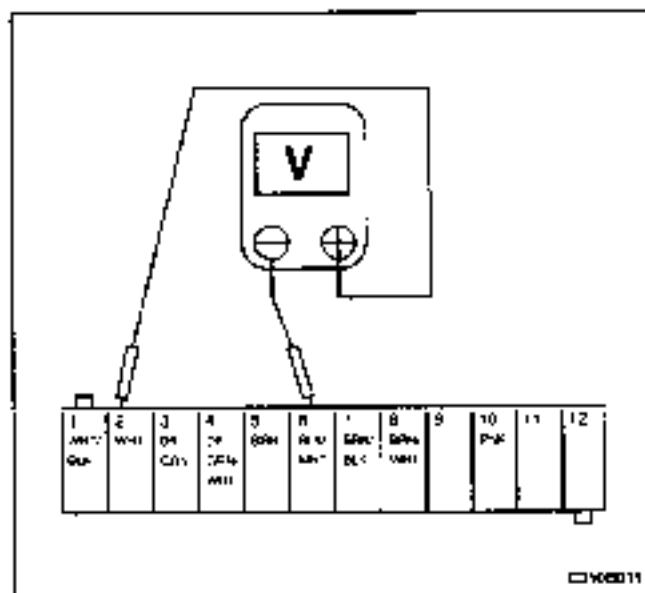
### DIAGNOSTIC ILLUSTRATION 12

Checking for a short circuit between the driver high circuit and ground.



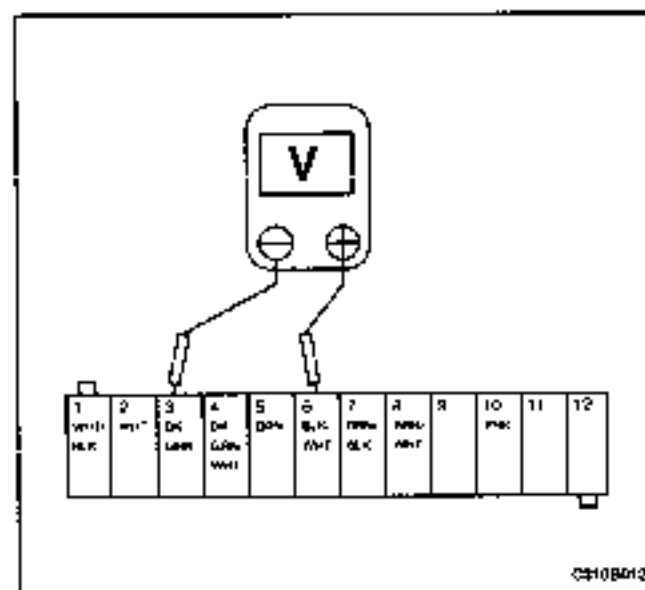
### DIAGNOSTIC ILLUSTRATION 13

Checking for a short circuit between the driver low circuit and ground.



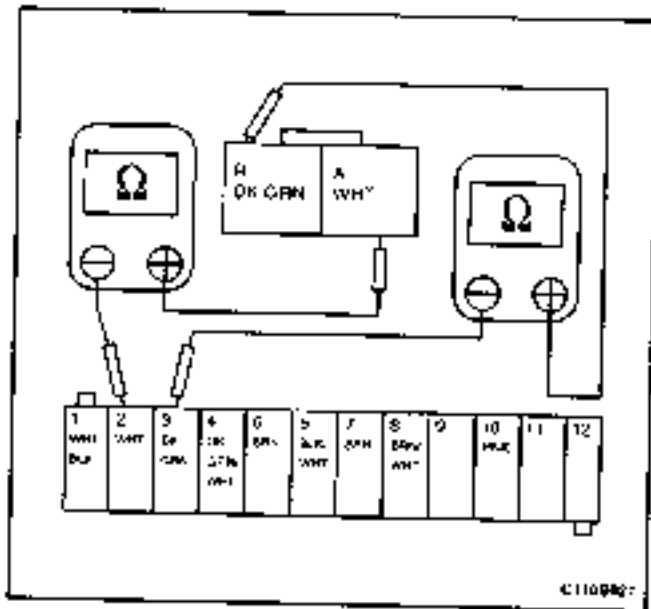
### DIAGNOSTIC ILLUSTRATION 14

Checking for a short circuit between the driver high circuit and voltage.



### DIAGNOSTIC ILLUSTRATION 15

Checking for a short circuit between the driver low circuit and voltage.



### DIAGNOSTIC ILLUSTRATION 16

Checking for an open circuit between the sensing and diagnostic module (SDM) and the clock spring.

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### SERVICE PRECAUTIONS

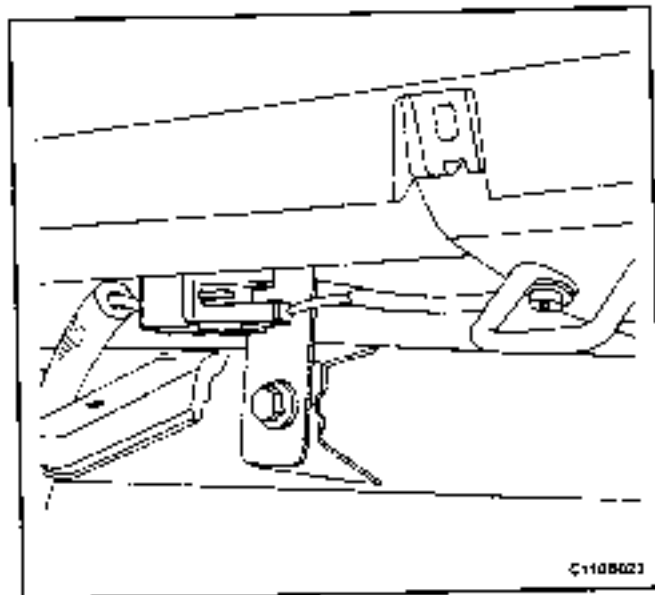
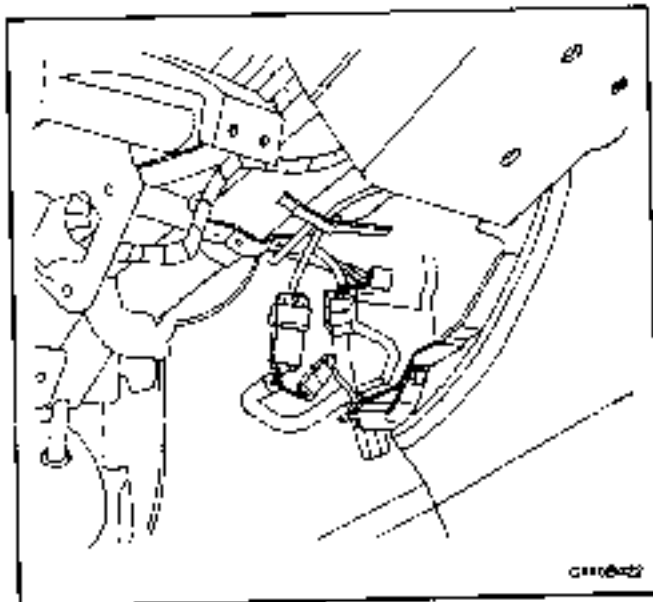
**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the AIRBAG fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM. If the airbags are disconnected, service can begin immediately without waiting for the 10-minute time period to expire. Failure to temporarily disable the SIR system during servicing can result in unexpected deployment, personal injury, and otherwise unneeded SIR system repairs.

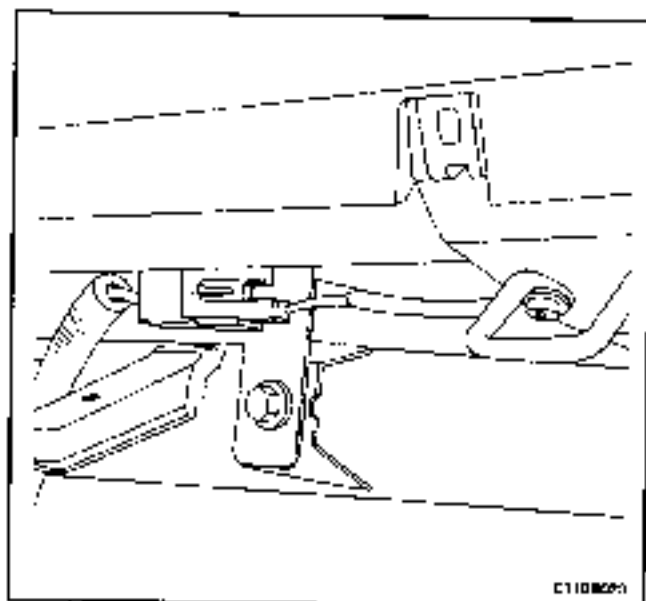
**Caution:** Do not measure the resistance of an airbag module with an ohmmeter. An ohmmeter checks resistance by sending current through a component, and the current from the ohmmeter's battery could cause unexpected deployment, personal injury, and otherwise unneeded SIR system repairs.

#### DISABLING THE SIR SYSTEM

(Left-Hand Drive Shown, Right-Hand Drive Similar)

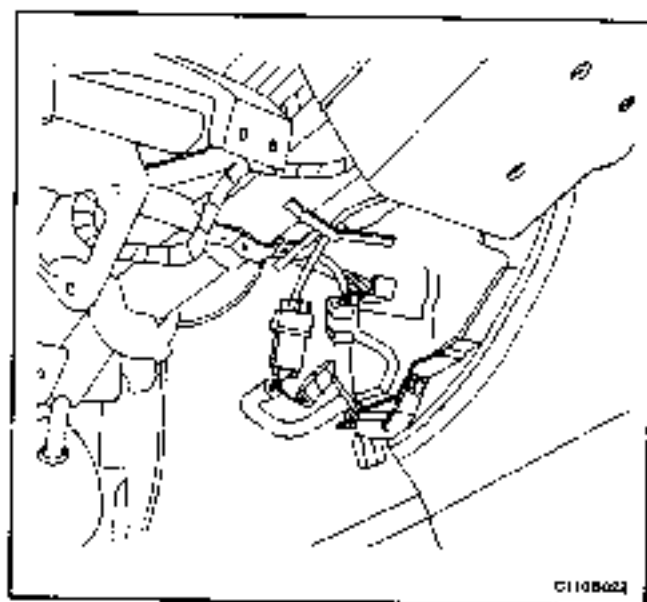
1. Turn the steering wheel to the straight-ahead position.
2. Turn the ignition switch to LOCK and remove the key.
3. Remove the driver-side knee bolster. Refer to Section 9G, Interior Trim.
4. Disconnect the yellow clock spring connector on the lower steering column.
5. Remove the glove box. Refer to Section 9E, Instrumentation/Driver Information.
6. Disconnect the passenger airbag connector.





### ENABLING THE SIR SYSTEM

1. Turn the ignition switch to LOCK and remove the key.
2. Connect the yellow connector at the passenger airbag.



3. Install the glove box. Refer to *Section 9F, Instrumentation/Driver Information*.
4. Connect the yellow connector at the lower steering column.
5. Install the driver-side knee bolster. Refer to *Section 9G, Interior Trim*.
6. Replace the AIRBAG fuse if it was previously removed.
7. Staying well away from the inflator modules, turn the ignition switch to ON, and verify that the AIRBAG indicator flashes seven times and then turns OFF. If it does not operate as described, perform the SIR Diagnostic System Check.

## HANDLING, INSTALLATION, AND DIAGNOSIS

- Airbag modules should not be subjected to temperatures above 65°C (150°F).
- An airbag module or a sensing and diagnostic module (SDM) should not be used if it has been dropped from a height of 0.9 meters (3 feet) or greater.
- When a SDM is replaced, it must be oriented with the arrow on the sensor pointing toward the front of the vehicle.
- It is very important for the SDM to be installed flat on the mounting surface, parallel to the vehicle's longitudinal axis.
- To avoid setting diagnostic trouble codes (DTCs), do not apply power to the SIR system unless all components are connected or a diagnostic chart requests it.
- The SIR Diagnostic System Check must be the starting point of any SIR diagnostics. The SIR Diagnostic System Check will verify proper AIRBAG indicator operation and will lead you to the correct chart to diagnose any SIR malfunctions. Bypassing these procedures may result in extended diagnostic time and incorrect parts replacements.

## REPAIRS AND INSPECTIONS REQUIRED AFTER AN ACCIDENT

**Caution:** Any repairs to the vehicle's structure must return it to the original production configuration. Deployment requires replacement of the SDM, the inflator modules, and a dimensional inspection of the steering column.

- If any SIR system components are damaged, they must be replaced. If SIR component mounting points are damaged, they must be repaired or replaced.
- Never use SIR parts from another vehicle. This does not include re-manufactured parts purchased from an authorized source.
- Do not attempt to service the SDM, the clock spring, or the airbag modules. These items must be replaced if they are defective.
- Verify the part number of replacement airbag modules. Some inflator modules look identical but contain different internal components.

## ACCIDENT WITH DEPLOYMENT – COMPONENT REPLACEMENT AND INSPECTIONS

Certain SIR components must be replaced or inspected for damage after a frontal crash involving airbag deployment. Replace the following SIR components:

- The SDM
- Inflator modules.

Inspect the clock spring and replace it if necessary. Inspect the wiring and the connector for any signs of scorching, melting, or damage due to excessive heat.

## ACCIDENT WITH OR WITHOUT DEPLOYMENT - COMPONENT INSPECTIONS

Curtain inspections must be performed after any crash, whether the airbag has deployed or not:

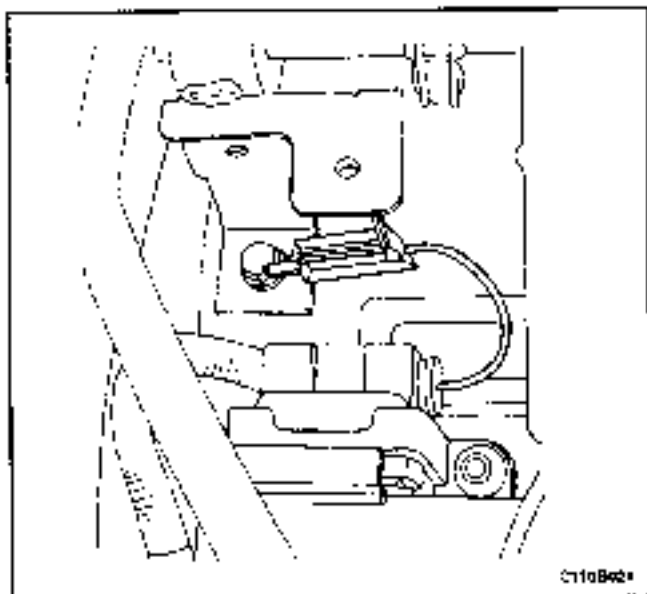
- The steering column must be dimensionally inspected.
- Inspect the knee bolsters and mounting points for distortion, bending, cracking, or other damage.
- Inspect the instrument panel (I/P) steering column reinforcement plate for distortion, bending, cracking, or other damage.
- Inspect the I/P braces for distortion, bending, cracking, or other damage.
- Inspect seat belts and mounting points. Refer to Section SA, *Seat Belts*.

## SENSING AND DIAGNOSTIC MODULE (SDM)

(Left-Hand Drive Shown, Right-Hand Drive Similar)

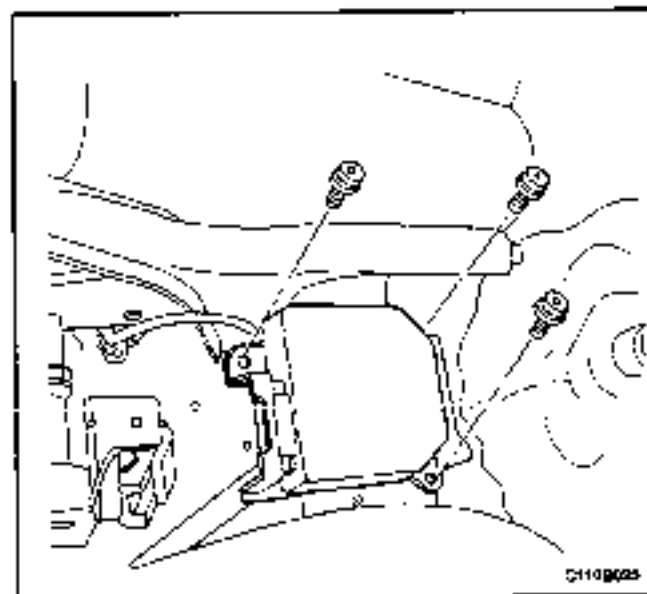
**Caution:** During service procedures, be very careful when handling the SDM. Never strike or jar the SDM. Never power up the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be carefully tightened, and the SDM arrow must be pointing toward the front of the vehicle to ensure proper operation of the SIR system. The SDM could be activated if it is powered while not rigidly attached to the vehicle, resulting in unexpected deployment and possible injury.

**Important:** If the vehicle interior has been exposed to extensive water intrusion such as water leaks, driving through high water, flooding, or other causes, the sensing and diagnostic module (SDM) and the SDM connector may need to be replaced. With the ignition OFF, inspect the area around the SDM including the carpet. If any significant soaking or evidence of previous soaking is detected, the water must be removed, the water damage repaired, and the SDM and SDM connector must be replaced. Before attempting any of these repairs, the supplemental inflatable restraint (SIR) system must be disabled. Refer to "Disabling the SIR System" in this section.

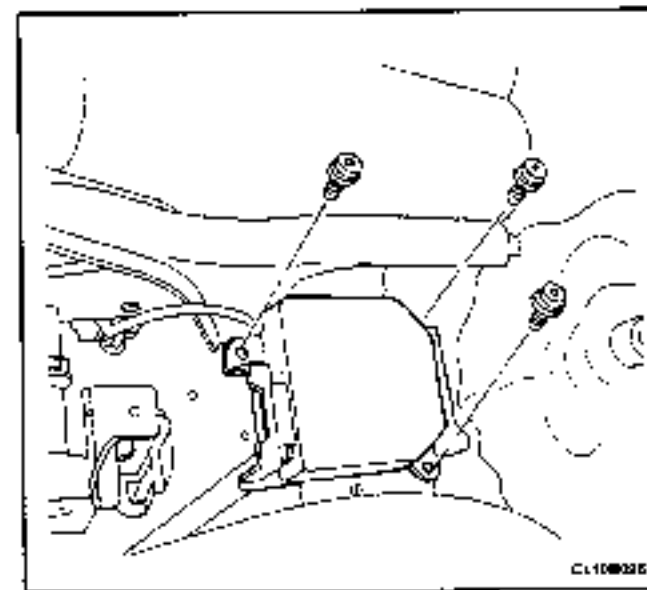


**Removal Procedure**

1. Disable the SIR system. Refer to "Disabling the SIR System" in this section.
2. Remove the floor console. Refer to Section 8G, Interior Trim.
3. Remove the connector position assurance lock, which is tethered to the SDM connector.



4. Disconnect the SDM electrical connector.
5. Remove the SDM mounting bolts.
6. Remove the SDM.



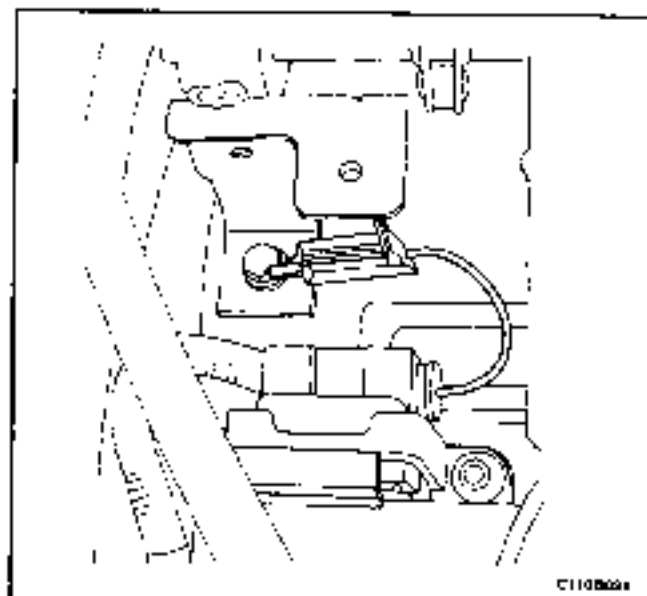
**Installation Procedure**

1. Install the SDM with the arrow pointing toward the front of the vehicle.
2. Install the SDM mounting bolts.

**Tighten**

Tighten the SDM mounting bolts to 10 N•m (89 lb-in).





3. Connect the SDM electrical connector.
4. Install the connector position assurance lock.
5. Install the floor console. Refer to Section 9G, Interior Trim.
6. Enable the SIR system. Refer to "Enabling the SIR System" in this section.

## DRIVER AIRBAG MODULE

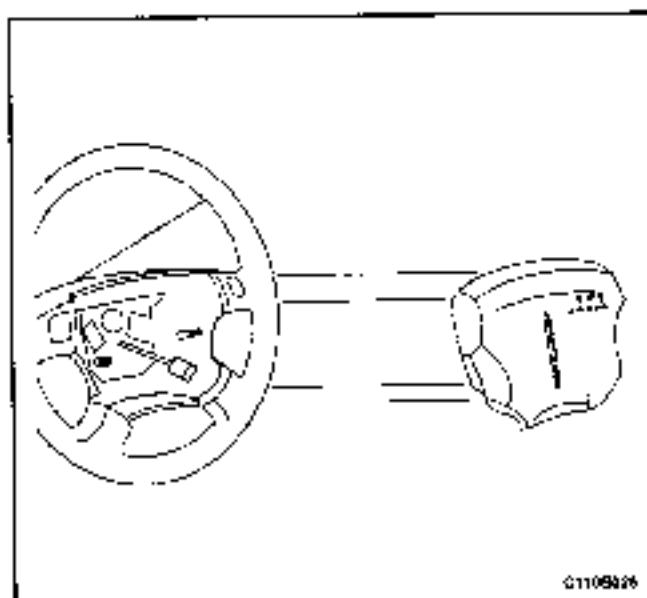
After deployment, a powdery residue may be on the surface of the airbag. The powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. Sodium hydroxide dust (similar to lye soap) is produced as a by-product of the deployment reaction. The sodium hydroxide then quickly reacts with atmospheric moisture and is converted to sodium carbonate and sodium bicarbonate (also known as baking soda). Therefore, it is unlikely that sodium hydroxide will be present after deployment. Wear gloves and safety glasses during the disposal procedure. Refer to "Deployed Airbag Module Disposal Procedure" in this section.

### Removal Procedure

1. Disconnect the negative battery cable.

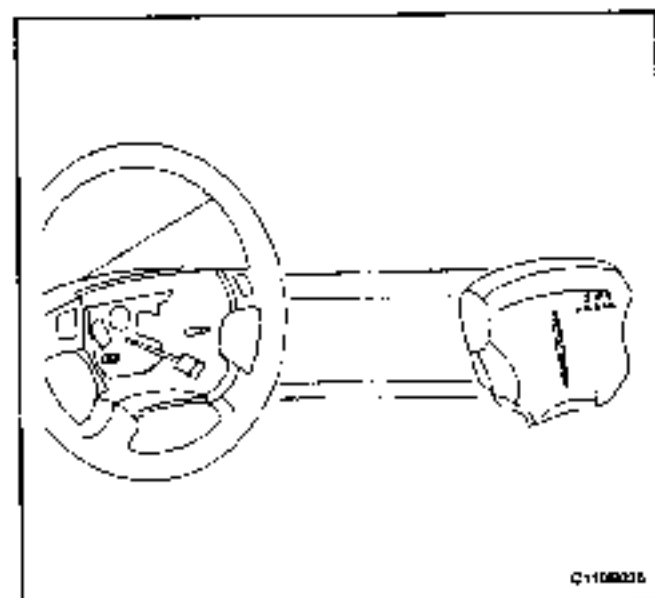
**Caution:** *The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the AIRBAG fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM. If the airbags are disconnected, service can begin immediately without waiting for the 10-minute time period to expire. Failure to temporarily disable the SIR system during servicing can result in unexpected deployment, personal injury, and otherwise unneeded SIR system repairs.*

2. If the airbag has not been deployed, remove the knee bolster and disconnect the yellow clock spring connector on the lower steering column. Refer to "Disabling the SIR System" in this section.
3. Position the steering wheel straight ahead.
4. Remove the driver airbag module mounting bolts.



**Caution:** When handling an airbag module, always keep the top of the unit facing upward. This leaves room for the airbag to expand if the module unexpectedly deploys. Without room for expansion, a module suddenly propelled toward a person or object can cause injury or vehicle damage.

5. Remove the connectors from the horn terminal and the driver airbag module.
6. Remove the driver airbag module.



### Installation Procedure

**Caution:** When removing an airbag module or handling a new airbag module, always keep the top of the unit facing upward. This leaves room for the airbag to expand if the module unexpectedly deploys. Without room for expansion, a module suddenly propelled toward a person or object can cause injury or vehicle damage.

1. Install the connectors to the horn terminal and the driver airbag module.
2. Install the driver airbag module.
3. Install the driver airbag module mounting bolts.

### Tighten

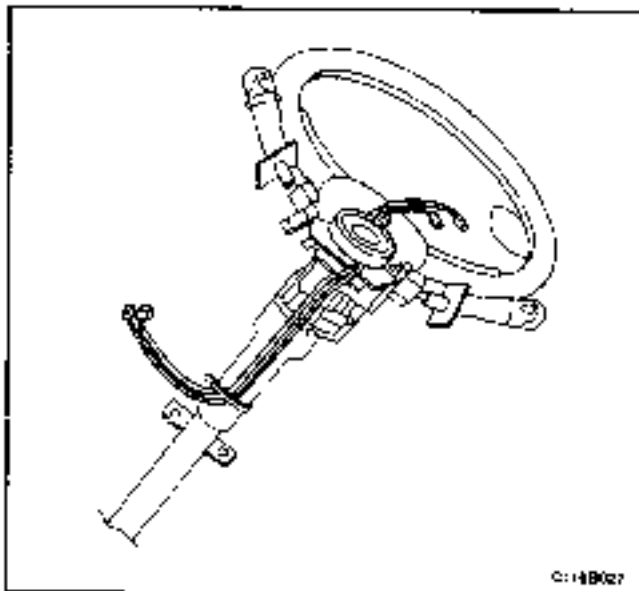
Tighten the driver airbag module mounting bolts to 4.6 N•m (41 lb-in).

4. If the yellow clock spring connector was previously disconnected, connect the clock spring connector on the lower steering column and replace the knee bolster.
5. Connect the negative battery cable.

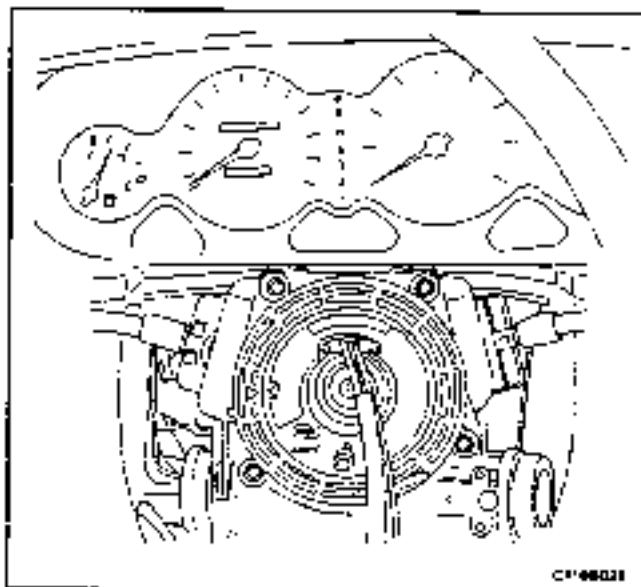
**CLOCK SPRING****Removal Procedure**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the AIRBAG fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM. If the airbags are disconnected, service can begin immediately without waiting for the 10-minute time period to expire. Failure to temporarily disable the SIR system during servicing can result in unexpected deployment, personal injury, and otherwise unneeded SIR system repairs.

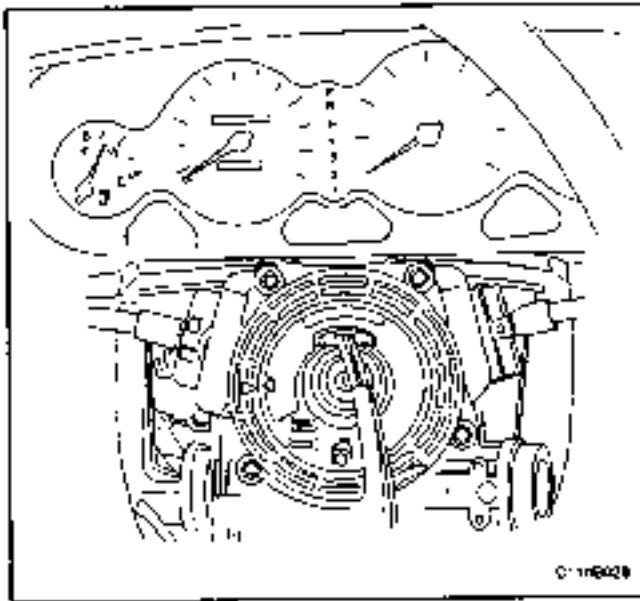
1. Disconnect the negative battery cable.
2. Turn the front wheels straight ahead.
3. Remove the driver side airbag module. Refer to "Driver Airbag Module" in this section.
4. Remove the steering wheel. Refer to Section 6E, *Steering Wheel and Column*.
5. Remove the driver-side knee bolster by carefully pulling until it snaps away from its mounting clips.
6. Disconnect the connectors at the lower steering column.
7. Remove the screws and the clock spring from the steering shaft.



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### Installation Procedure

**Caution:** If the clock spring is not properly aligned, the steering wheel may not be able to rotate completely during a turn. Restricted turning ability can cause the vehicle to crash. Improper alignment of the clock spring also may make the supplemental inflatable restraints (SIR) system inoperative, preventing the airbags from deploying during a crash. Both of these outcomes can result in injury.

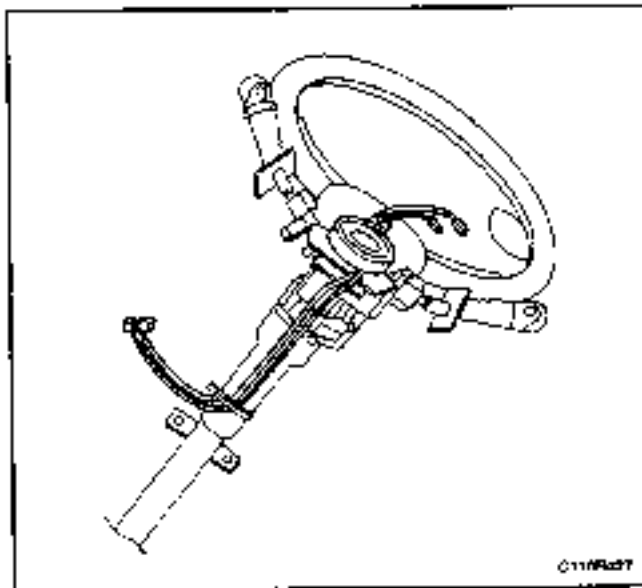
**Notice:** Turning the clock spring more than three turns clockwise or more than three turns counterclockwise can damage the spring.

1. Turn the front wheels straight ahead.
2. Install the clock spring with the screws.

### Tighten

Tighten the clock spring mounting screws to 1.25 N•m (11 lb-in).

**Important:** The clock spring may come packed in material used to prevent damage to the spring during shipping or storage. Avoid installing any of the packing material with the clock spring.



3. Turn the lobe of the clock spring clockwise to lock.
4. Turn the lobe of the clock spring counterclockwise approximately three turns to the neutral position, with the front wheels straight ahead.
5. Properly align the pointed marks on the components of the clock spring.
6. Connect the electrical connectors on the lower steering column.
7. Install the driver-side knee bolster.
8. Install the steering wheel. Refer to Section 6E, *Steering Wheel and Column*.
9. Connect the driver side airbag module and the horn connectors.
10. Install the driver side airbag module. Refer to "Driver Side Airbag Module" in this section.
11. Connect the negative battery cable.

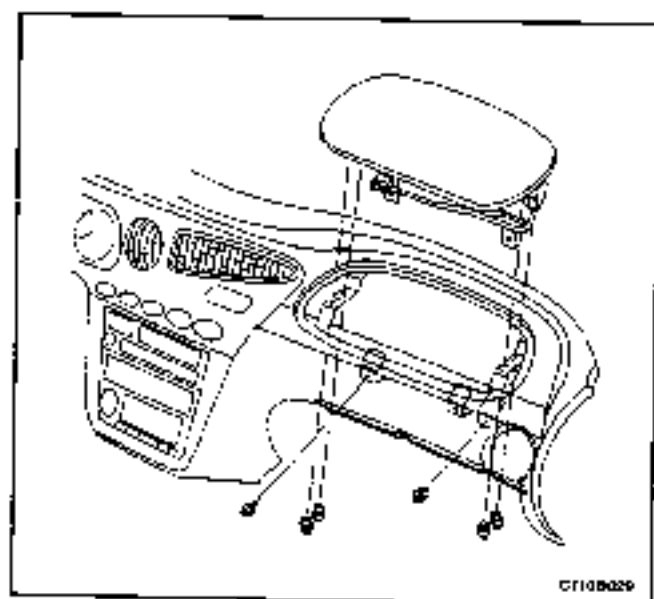
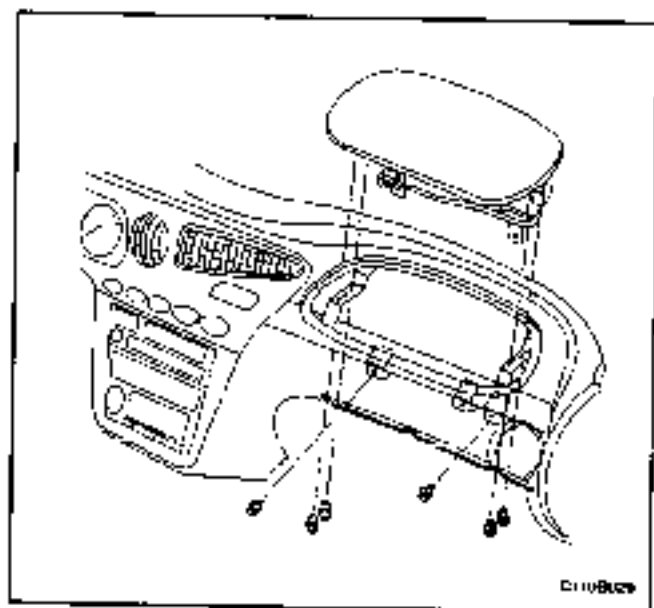
**PASSENGER AIRBAG MODULE****(Left-Hand Drive Shown, Right-Hand Drive Similar)**

After deployment, a powdery residue may be on the surface of the airbag. The powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. Sodium hydroxide dust (similar to lye soap) is produced as a by-product of the deployment reaction. The sodium hydroxide then quickly reacts with atmospheric moisture and is converted to sodium carbonate and sodium bicarbonate (also known as baking soda). Therefore, it is unlikely that sodium hydroxide will be present after deployment. Wear gloves and safety glasses during the disposal procedure. Refer to "Deployed Airbag Module Disposal Procedure" in this section.

**Removal Procedure**

**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF or the AIRBAG fuse has been removed.

1. Turn the ignition switch to LOCK and remove the key.
2. Remove the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
3. Disconnect the passenger airbag yellow electrical connector.
4. Remove the passenger airbag mounting bolts.
5. Remove the passenger airbag module from the instrument panel.

**Installation Procedure**

1. Install the passenger airbag module in the instrument panel.
2. Install the passenger airbag mounting bolts.

**Tighten**

Tighten the passenger airbag mounting bolts to 10 N·m (89 lb-in).

3. Connect the passenger airbag electrical connector.
4. Install the glove box. Refer to Section 9E, *Instrumentation/Driver Information*.
5. Perform the SIR Diagnostic System Check in this section.

## **AIRBAG MODULE DEPLOYMENT (IN VEHICLE)**

Deploy airbags before disarming of them. If a vehicle to be scrapped, the airbags may be deployed inside the vehicle.

*Caution: Before deploying the airbags, remove all loose objects from the airbag's expansion area.*

*Caution: Deploy the airbags with the vehicle doors closed and the side windows open.*

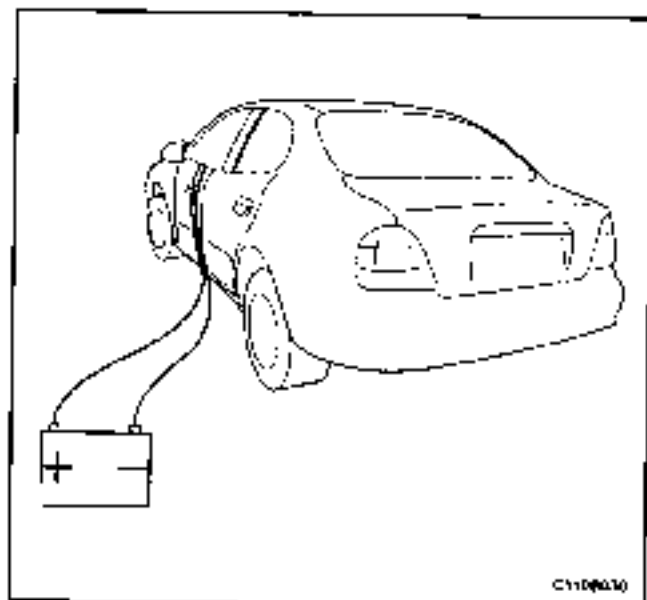
*Caution: Deploy the airbags only in an evacuated area. Service personnel who must be present during the deployment should be at least 10 meters (33 feet) in front of the vehicle.*

*Caution: Do not connect the voltage source until after having completed all other preparations for the deployment of the airbags.*

*Caution: Allow a deployed airbag module to cool for at least 30 minutes before handling.*

*Caution: Wear gloves and eye protection during the disposal process.*

*Caution: If the deployment fails, disconnect the voltage source and wait 5 minutes before approaching the vehicle.*

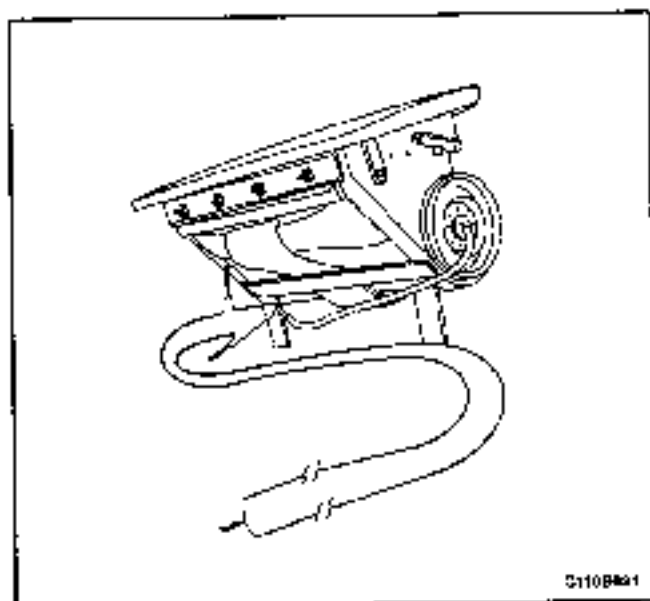


### Deployment Procedure

1. Disconnect both battery cables and place the battery at least 10 meters (33 feet) from the vehicle.

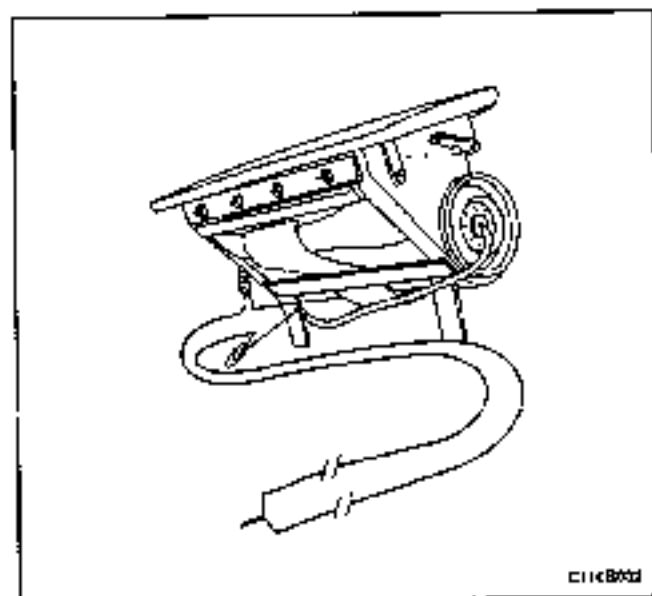
**Caution:** The SDM can maintain sufficient voltage to deploy the airbags for 10 minutes after the ignition is OFF and the AIRBAG fuse has been removed. If the airbags are not disconnected, service cannot begin until 10 minutes have passed after disconnecting power to the SDM. If the airbags are disconnected, service can begin immediately without waiting for the 10-minute time period to expire. Failure to temporarily disable the SIR system during servicing can result in unexpected deployment, personal injury, and otherwise unneeded SIR system repairs.

2. Remove the knee bolster from the steering column. Refer to Section 9G, Interior Trim.
3. At the lower steering column, cut the two wires leading from the supplemental inflatable restraint (SIR) harness to the clock spring.
4. Strip 13 mm (0.5 inch) of insulation from the ends of the wires leading to the clock spring.
5. Use two additional wires, each at least 10 meters (33 feet) long, to reach from the deployment battery to the inflator module.
6. Strip 13 mm (0.5 inch) of insulation from the ends of these two additional wires.
7. Twist the two wires together at one end.
8. Place the twisted ends of the two wires near the deployment battery. Do not connect the wires to the battery at this time.
9. Using the free ends of the 10-meter (33-foot) wires leading to the clock spring, make two splices, one at each wire from the airbag module.
10. Wrap the splices with insulating tape.
11. Now that the free ends of the 10-meter (33-foot) wires are spliced to the airbag module wires, and the ends that are twisted together are near the deployment battery, clear the area.
12. Untwist the wires that are near the deployment battery.
13. Touch one wire to the positive battery terminal and touch the other wire to the negative battery terminal. The airbag will deploy.



14. Repeat the procedure for the passenger airbag, cutting the wires to the passenger airbag module instead of the wires leading to the clock spring.
15. Strip 13 mm (0.5 inch) of insulation from the ends of the wires leading to the passenger airbag module.
16. Use two additional wires, each at least 10 meters (33 feet) long, to reach from the deployment battery to the passenger airbag module.
17. Strip 13 mm (0.5 inch) of insulation from the ends of these two additional wires.
18. Twist the two wires together at one end.
19. Place the twisted ends of the two wires near the deployment battery. Do not connect the wires to the battery at this time.
20. Using the free ends of the 10-meter (33-foot) wires to the passenger airbag module, make two splices, one at each wire from the airbag module.

21. Wrap the splices with insulating tape.

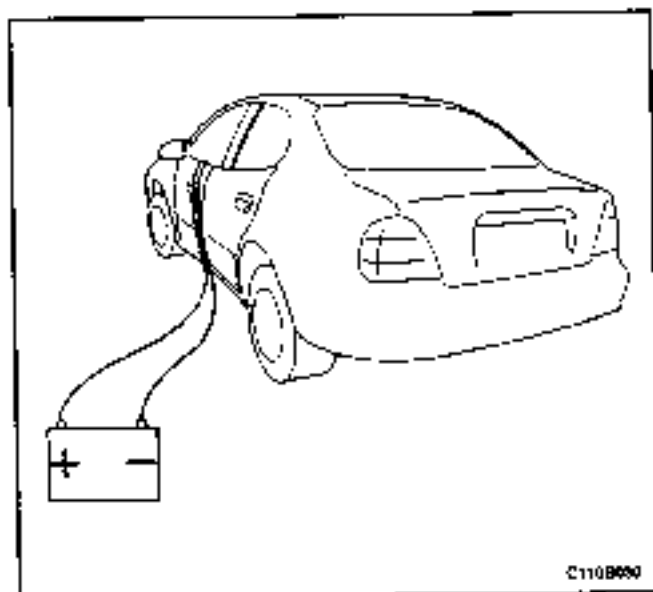


22. Now that the free ends of the 10 meter (33-foot) wires are spliced to the passenger airbag module wires, and the ends that are twisted together are near the deployment battery, clear the area.

23. Unwrist the wires that are near the deployment battery.

24. Touch one wire to the positive battery terminal and touch the other wire to the negative battery terminal. The passenger airbag will deploy.

25. Using the proper precautions, dispose of the deployed airbag. Refer to "Deployed Airbag Module Disposal Procedure" in this section.





## AIRBAG MODULE DEPLOYMENT (OUTSIDE OF VEHICLE)

If the vehicle is within the warranty period, contact the Daewoo regional service manager for approval or special instructions before deploying the airbag modules. Deploy airbag modules in the following situations:

- If a vehicle is to be scrapped. Refer to "Airbag Module Deployment (Inside of Vehicle)" in this section.
- If an airbag module is damaged during transit, storage, or service.

**Caution:** Deploy the airbags only in an evacuated area. Service personnel who must be present during the deployment should be at least 10 meters (33 feet) in front of the vehicle.

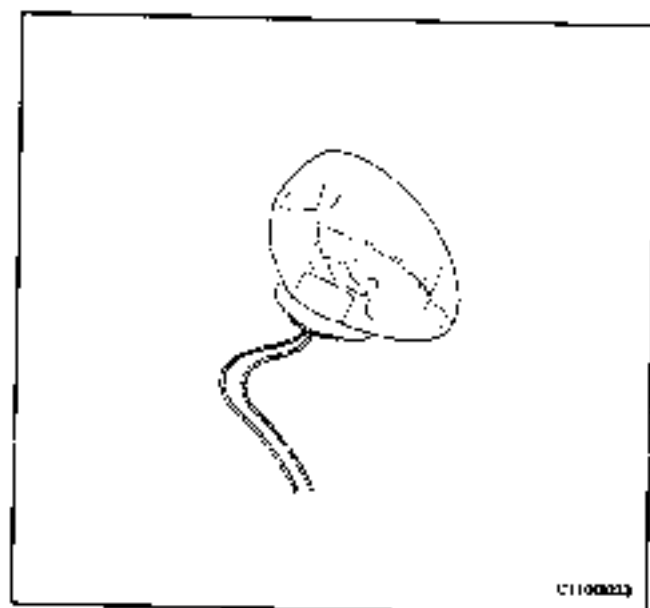
**Caution:** Do not connect the voltage source until completing all other preparations for the deployment of the airbags.

**Caution:** Allow a deployed airbag module to cool for at least 30 minutes before removing it from the vehicle.

**Caution:** Wear gloves and eye protection during the disposal process.

**Caution:** If the deployment fails, disconnect the voltage source and wait 5 minutes before approaching the vehicle.

1. Position the airbag module face up, on flat ground outdoors, at least 10 meters (33 feet) from any obstacles or people.
2. Place a vehicle battery at least 10 meters (33 feet) away from the airbag module.
3. Deploy the airbag module using the deployment tool.
4. Using the proper precautions, dispose of the deployed airbag. Refer to "Deployed Airbag Module Disposal Procedure" in this section.



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## DEPLOYED AIRBAG MODULE DISPOSAL PROCEDURE

After deployment, a powdery residue may be on the surface of the airbag. The powder consists primarily of cornstarch (used to lubricate the bag as it inflates) and by-products of the chemical reaction. Sodium hydroxide dust (similar to lye soap) is produced as a by-product of the deployment reaction. The sodium hydroxide then quickly reacts with atmospheric moisture and is converted to sodium carbonate and sodium bicarbonate (also known as baking soda). Therefore, it is unlikely that sodium hydroxide will be present after deployment.

**Caution:** Wear gloves and safety glasses during the disposal procedure.



**Caution:** After deployment, the metal surfaces of the airbag module will be hot. In order to avoid the risk of an injury or a fire, do not place the deployed airbag modules near any flammable objects, and allow the airbag modules to cool for 30 minutes before handling them.

Deploy an airbag before disposing of it. This includes those in a whole vehicle being scrapped. If the vehicle is still within the warranty period, contact the Daewoo regional service manager for approval or special instructions before deploying an airbag module. Deployed airbag modules should be disposed of in the same manner as any other scrap parts, with the addition of the following steps:

1. Place the deployed airbag in a sturdy plastic bag.
2. Seal the plastic bag securely.
3. Wash your hands and rinse them with water after handling a deployed airbag.

## SIR WIRING REPAIR

### Connector Repair

**Caution:** Before attempting any repairs, the SIR system must be disabled. Refer to "Disabling the SIR System" in this section for instructions on how to disable the SIR system.

The terminals in the SIR system are made of a special metal to provide necessary contact integrity for the sensitive, low-energy circuits. These terminals are available only in the connector repair assembly packs. Do not substitute any other terminals for those in the assembly packs.

### Wire Repair

**Caution:** Before attempting any repairs, the SIR system must be disabled. Refer to "Disabling the SIR System" in this section for instructions on how to disable the SIR system.

Do not repair wires or connectors attached to the passenger airbag module or the clock spring. If the wires or connectors on the clock spring or passenger airbag are damaged, the clock spring or passenger airbag must be replaced. If any other wire is damaged, the wire should be repaired by splicing in a new section of wire of the same gauge. To protect the repair, spliced wires must be sealed with heat-shrink tubing. If the splices are not made correctly, the result will be a high-resistance connection, and the AIRBAG indicator will turn on.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### SIR SYSTEM

(Left-Hand Drive Shown, Right-Hand Drive Similar)

The supplemental inflatable restraints (SIR) system is a safety device used in conjunction with the seat belts.

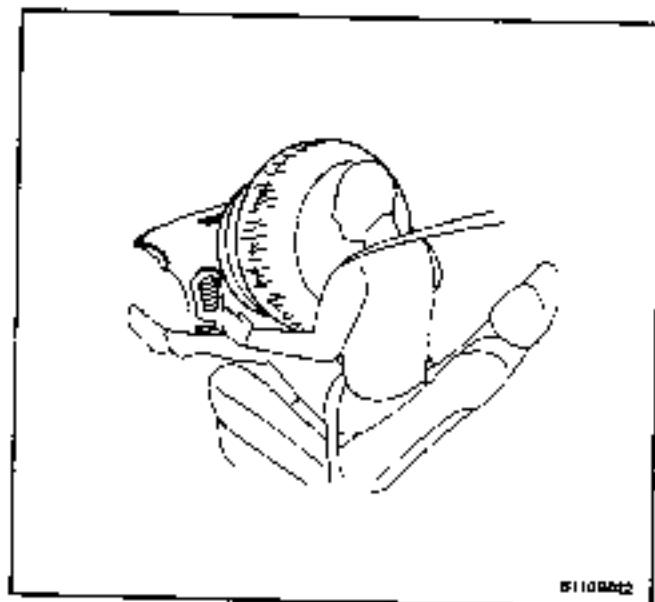
The airbag does not replace the function of the seat belt. The driver and the passengers must always fasten their seat belts and adjust them for a proper fit.

The SIR is designed to protect the driver and the front seat passenger in the event of a significant frontal impact to the vehicle. The airbags deploy if the force is applied from a direction within 30 degrees of the vehicle's centerline.

The SIR system consists of a

- Driver side airbag module
- Passenger side airbag module.
- Sensing and diagnostic module (SDM).
- Clock spring.
- Wire harness and connectors.
- AIRBAG indicator on the instrument cluster.

There are two separate deployment loops in the SIR system. The term "loop" is used because current leaves the SDM and returns to the SDM during deployment or testing. One loop is the circuit from the SDM to the driver airbag and back to the SDM. The other loop is the circuit from the SDM to the passenger airbag and back to the SDM.



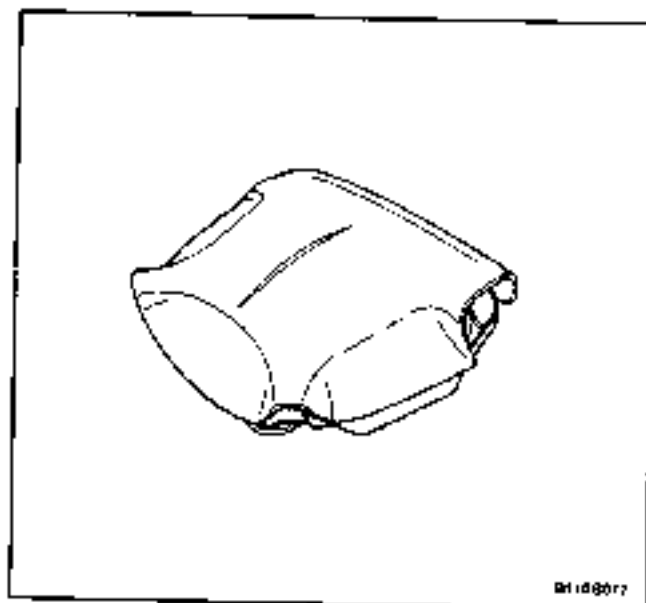
### AIRBAG MODULES

#### Driver Airbag Module

**Caution:** Tampering with the driver side airbag module creates the risk of an injury from an unexpected deployment. Therefore, the driver side airbag module should never be disassembled.

The driver airbag module is under the center pad of the steering wheel.

The driver airbag module contains an ignitor charge and a gas generator to inflate the folded airbag.



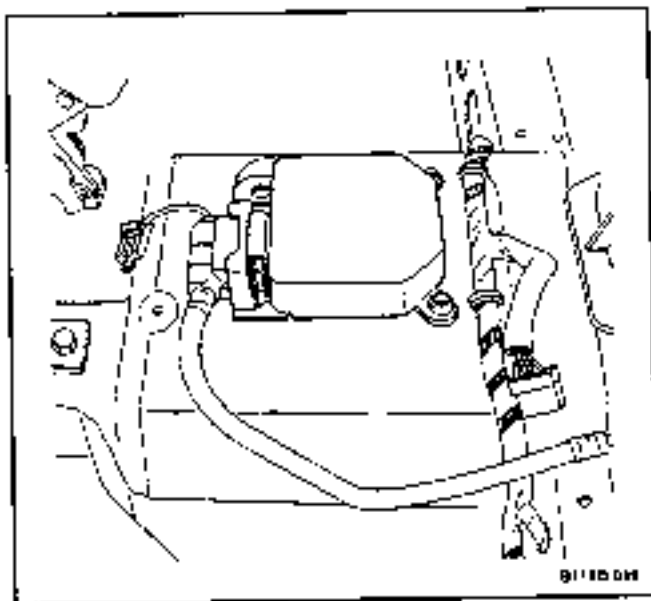
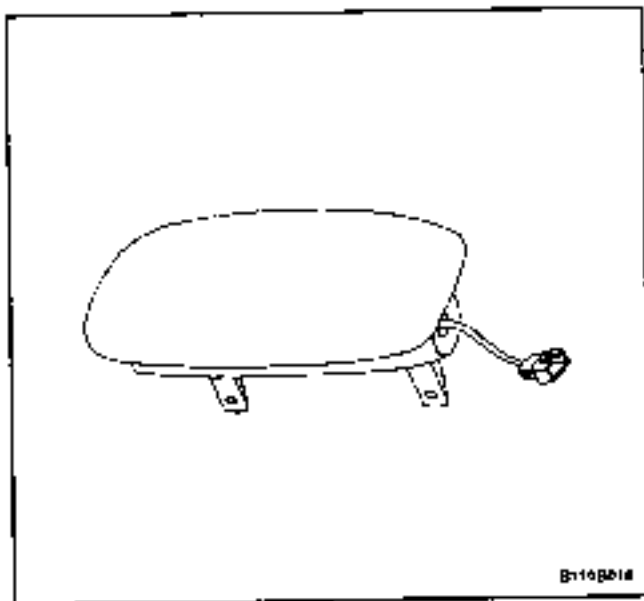
#### Passenger Airbag Module

**Caution:** Tampering with the passenger side airbag module creates the risk of an injury from an unexpected deployment. Therefore, the passenger side airbag module should never be disassembled.

The passenger airbag module is on the passenger side of the instrument panel.

The passenger airbag module contains an ignitor charge and a gas generator to inflate the folded airbag.

The passenger airbag also includes wiring and a connector. The airbag side of the yellow connector contains a shorting bar which short-circuits the passenger high circuit to the passenger low circuit when the connector is disconnected. The shorting bar prevents current from traveling through the passenger airbag module during servicing. The shorting bar is disengaged when the connector is connected. If the wiring or connector on the passenger airbag is damaged, the passenger airbag must be replaced.



## SENSING AND DIAGNOSTIC MODULE (SDM)

**Caution:** During service procedures, be careful when handling the SDM. Never shake or jar the SDM. Never apply power to the SIR system when the SDM is not rigidly attached to the vehicle. All SDM mounting bolts must be fully tightened. The arrow on the SDM must point toward the front of the vehicle. Failure to follow these precautions could cause deployment and result in personal injury.

The SDM is located on the floor beneath the floor console assembly. The SDM performs the following functions:

- Monitors the supplemental inflatable restraint (SIR) system electrical components and sets a diagnostic trouble code (DTC) when a malfunction is detected.
- Records any faults that are discovered.
- Displays SIR diagnostic trouble codes and system status information when connected to a scan tool.
- Illuminates the AIRBAG indicator to alert the driver to any faults.
- Provides a reserve power source to deploy the airbags if an accident has disabled the normal power source.
- Monitors vehicle velocity changes to detect frontal impacts which are severe enough to warrant deployment.
- Causes current to flow through the airbag modules to cause deployment if a frontal impact of sufficient force is detected.

The SDM contains no user-serviceable parts.

## AIRBAG WARNING LAMP

The instrument cluster contains an AIRBAG warning indicator. To verify the operation of the AIRBAG indicator and the sensing and diagnostic module (SDM), the SDM performs a turn-on test when the ignition is turned ON. The SDM flashes the AIRBAG indicator seven times by supplying an intermittent ground to the indicator lamp circuit. After flashing seven times, the AIRBAG indicator will turn off if no malfunctions have been detected.

The AIRBAG indicator stays on if the SDM has detected malfunctions in the internal or external circuits which could potentially affect the operation of the supplemental inflatable restraint (SIR) system. Some malfunctions could result in non-deployment when necessary or deployment under conditions which would not normally result in deployment.

When the SDM is not properly attached to its connector, the AIRBAG circuit is shorted to ground because there is a shorting bar within the SDM electrical connector. The shorting bar is disengaged when a proper connection is made, but if a poor connection exists the SDM connector supplies a ground to the AIRBAG indicator independently of the SDM, and the AIRBAG indicator turns on.

## CLOCK SPRING

**Caution:** *Disassembling the clock spring can cause injury or cause the clock spring to malfunction.*

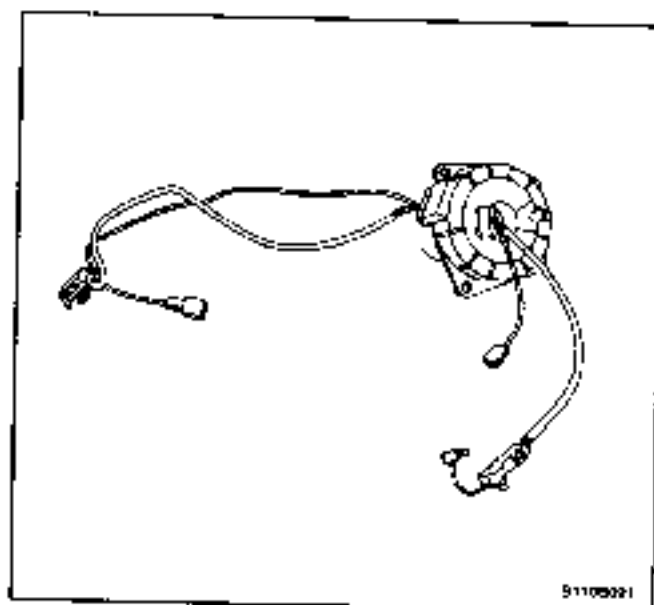
**Caution:** *Over-rotating the clock spring without the steering wheel in position could damage the clock spring and result in an inoperative driver airbag.*

There is a coil assembly in the steering which is referred to as a clock spring because of its internal resemblance to the type of spring used in a mechanical clock. The clock spring should never be disassembled, and there is no timekeeping function. The clock spring contains current-carrying coils. Two of the current-carrying coils maintain continuous contact within the driver deployment loop while the steering wheel is rotated. The clock spring also contains a coil that maintains continuous contact for the horn circuit.

Turning the steering wheel in one direction tightens the coil, and turning the steering wheel in the opposite direction loosens the coil. Do not turn rotate the clock spring when the steering wheel is not attached. Refer to "Clock Spring" in this section for proper installation of the clock spring.

The clock spring also includes the wiring and the connectors for the horn circuit and the driver airbag circuit. A

yellow two-way connector on the lower steering column is attached to the clock spring wiring. The airbag side of the yellow connector contains a shorting bar which connects the driver high circuit to the driver low circuit when the connector is disconnected. The shorting bar prevents current from traveling through the driver airbag module during servicing. The shorting bar is disengaged when the clock spring connector is connected.



51108021



# BODY AND ACCESSORIES

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SECTION 9A	BODY WIRING SYSTEM
SECTION 9B	LIGHTING SYSTEMS
SECTION 9C	HORNS
SECTION 9D	WIPERS / WASHER SYSTEMS
SECTION 9E	INTRUMENTATION / DRIVER INFORMATION
SECTION 9F	AUDIO SYSTEMS
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SECTION 9L	GLASS AND MIRRORS
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SECTION 9U	CRUISE CONTROL SYSTEM





# SECTION 9A

## BODY WIRING SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SCHEMATIC AND ROUTING DIAGRAMS

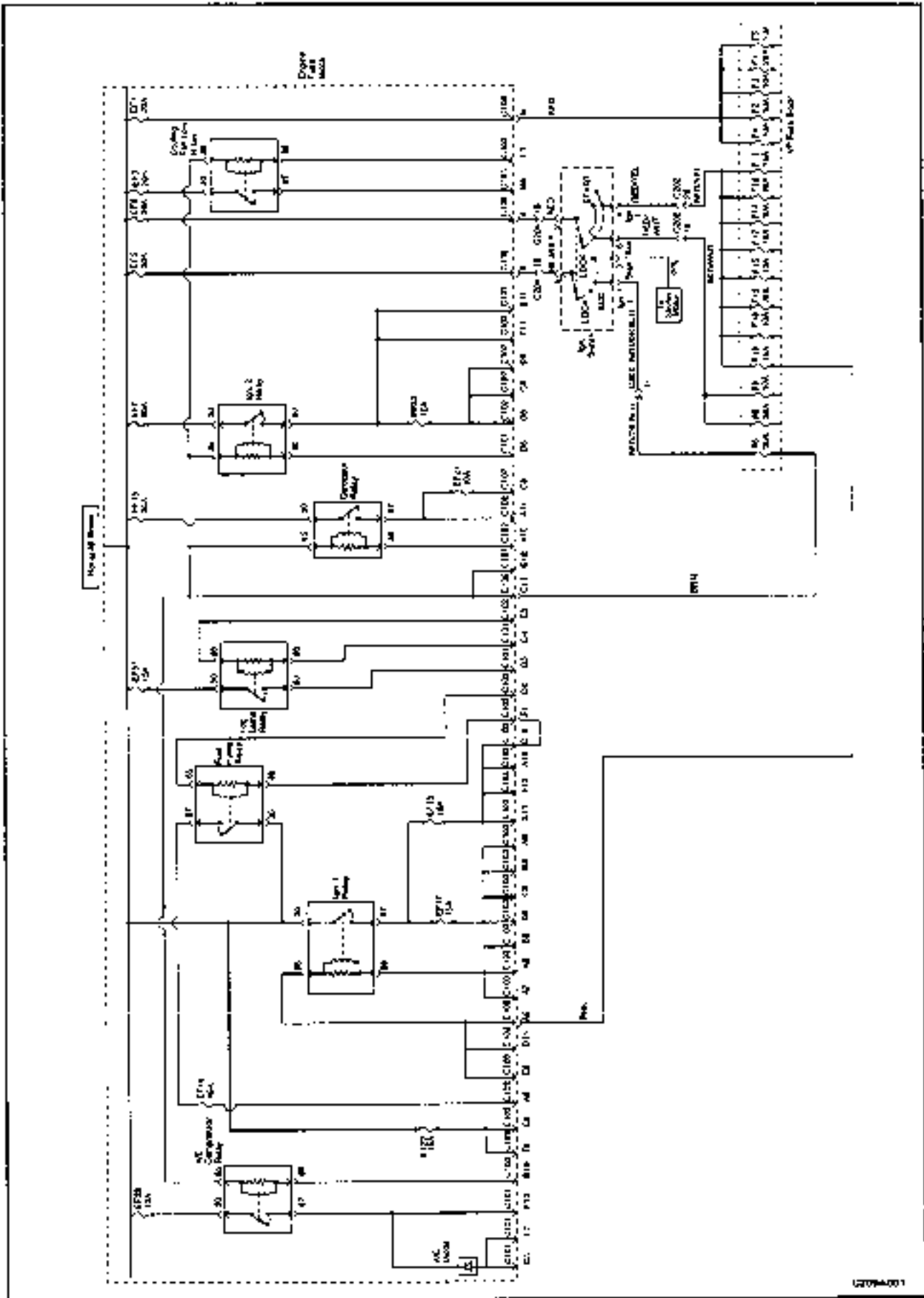
### WIRE COLOR CHART

Wire Color	Abbreviation On Schematic
Green	DK GRN
Light Green	LI GRN
Blue	DK BLU
Brown	BRN
Orange	ORN
Yellow	YEL
Grey	GRY
Sky Blue	LT BLU
Red	RED
Black	BLK
Pink	PNK
White	WHT
Purple	PPL

### Wires With Tracers

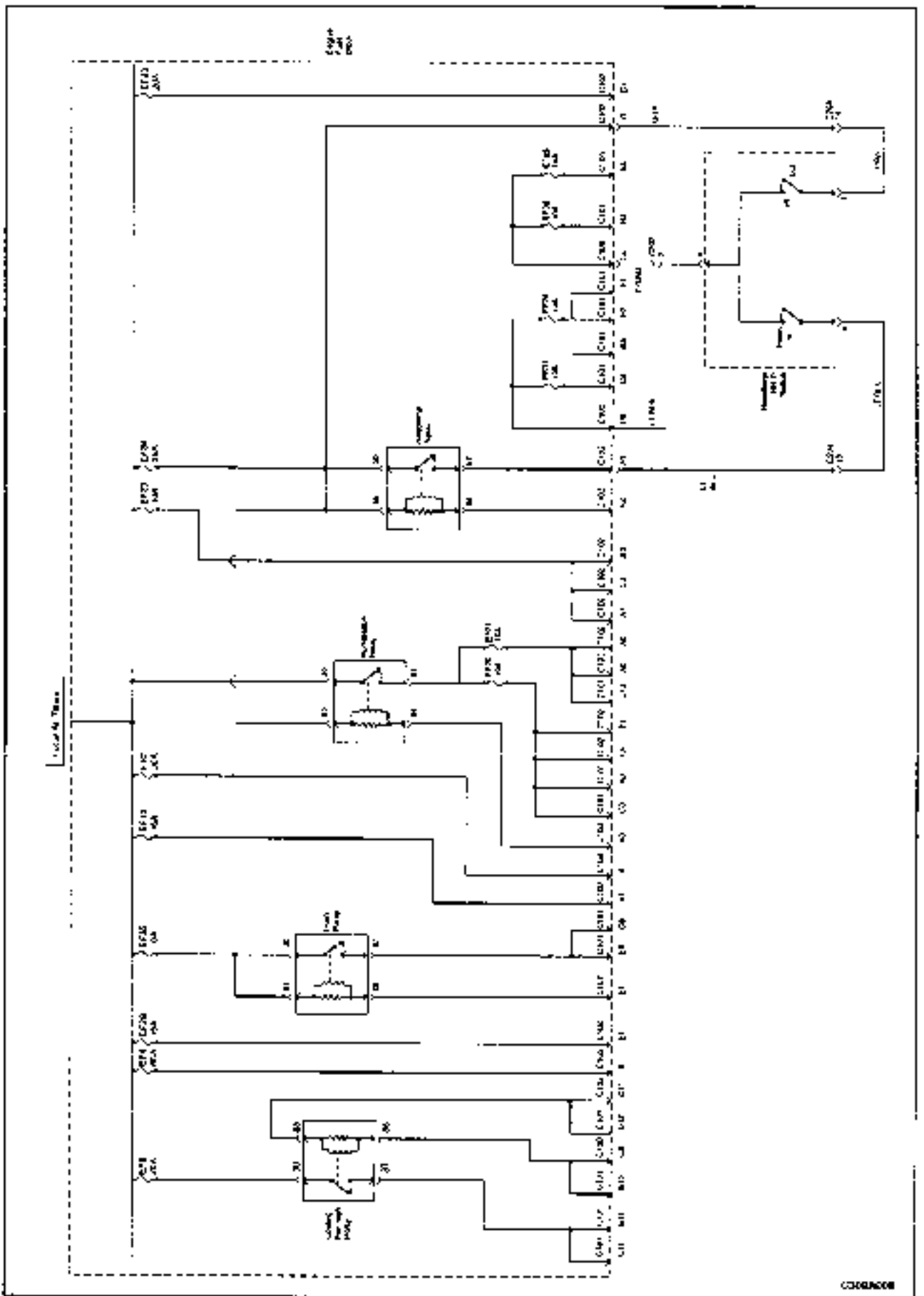
Wire Color	Abbreviation On Schematic
Red with White Tracer	RED/WHT

POWER DISTRIBUTION SCHEMATIC



12794-001

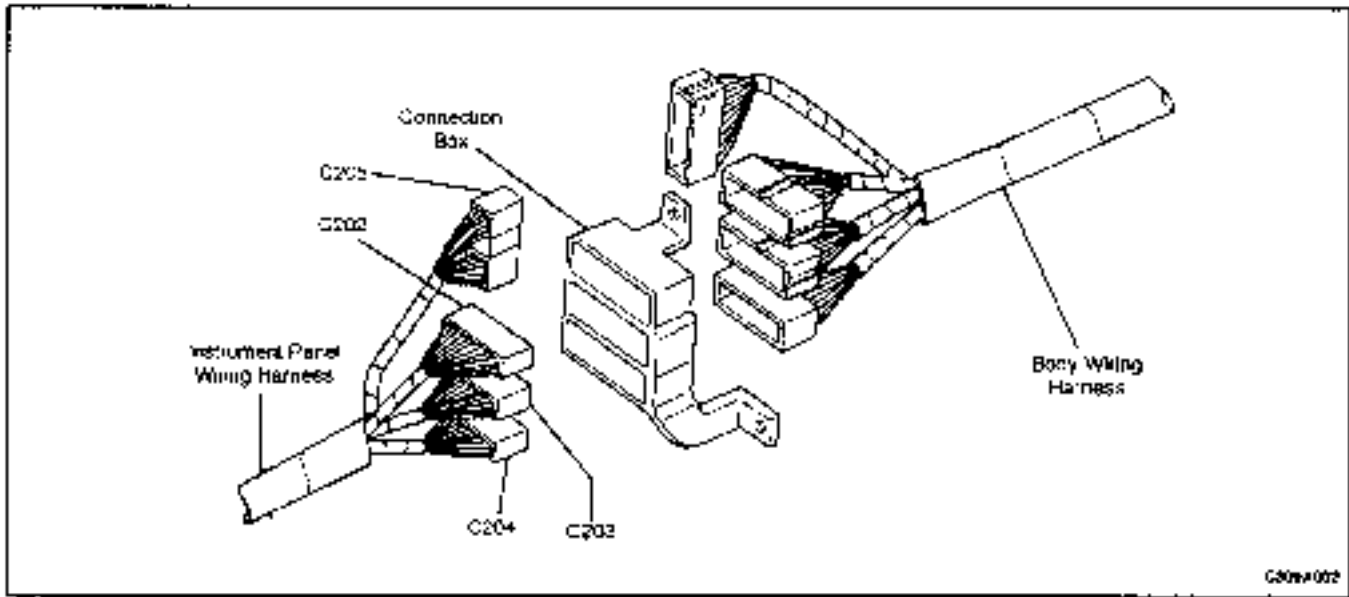
POWER DISTRIBUTION SCHEMATIC (Cont'd)



9A 3

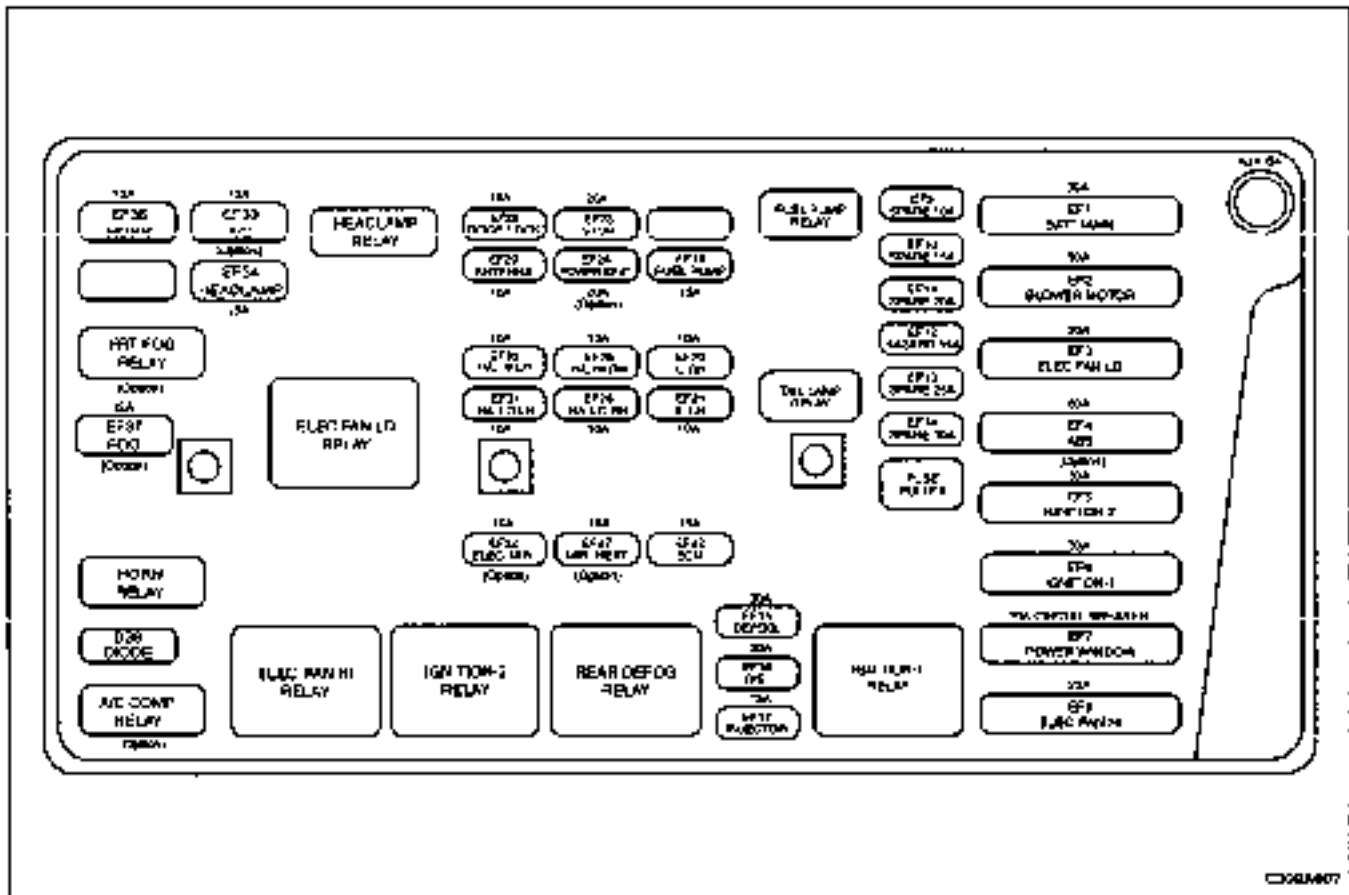
WIPER MOTOR

CONNECTION BOX DIAGRAM



CS094002

FUSE BLOCK LOCATOR (ENGINE)



CS094007

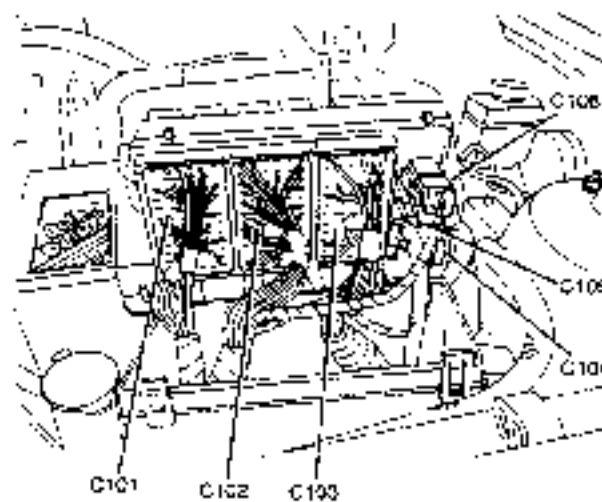
## FUSE BLOCK LOCATOR (PASSENGER COMPARTMENT)

10A	WASH WINDOW F1	
10A	TRAY/DOOR F2	15A TURN SIGNAL F11
10A	REAR WIPER F3	20A WIPER F12
20A	2ND ROW POWER SEAT F4	15A FOL F13
10A	REAR SIDE LAMP F5	15A 3RD ROW POWER F14
20A	COOL MOTOR F6	15A 1-TRAC F15
		20A SUN ROOF F16
20A	OG-BLIND TYP F8	10A MISC F17
10A	AUX. C. CLOCK F9	15A INSTRUMENT F18
TOP BRIDGE	15A BRIDGE	POSS PULLER

NOTE: \* TYPICAL EQUIPMENT

C205A002

## FUSE BLOCK ELECTRICAL CONNECTOR (Left-Hand Drive Shown, Right-Hand Drive Similar)



C106A001

## FUSE CHART

Fuse	Rating/Source		Circuit
EF1 (Engine Fuse)	30A	BAT	Fuses F1, F2, F3, F4, F5
EF2	30A	BAT	Blower Motor Relay, Blower Motor, Auto. Temp. Control Relay, ATC Controller
EF3	20A	BAT	Cooling Fan (Low) Relay, Aux. Cooling Fan, Cooling Fan Control Relay
EF4	40A	BAT	ABS Relay, Electronic Brake Control Module
EF5	30A	BAT	Ign 2 (Ign Key), Starter
EF6	30A	BAT	Ign 1 (Ign Key), ACC, F17, F18
EF7	20A	BAT	Ign 2 Relay, EF32, Keyless Entry System, Sun Roof, Power Window Main Switch
EF8	20A	BAT	Cooling Fan (High) Relay, Cooling Fan Control Relay, Main Cooling Fan
EF9	10A	-	Spare
EF10	15A	-	Spare
EF11	20A	-	Spare
EF12	15A	BAT	Hazard Switch
EF13	25A	-	Spare
EF14	30A	-	Spare
EF15	30A	BAT	Back Window Defogger, Defogger Relay, EF27
EF16	15A	BAT	Alternator Terminal F, Direct Ignition System Module, Fuel Pump Relay, Charcoal Canister Purge Solenoid, Engine Control Module
EF17	15A	BAT	Fuel Injectors, EGR Solenoid
EF18	-	-	Blank
EF19	15A	BAT	Fuel Pump, ALDL Connector E
EF20	10A	BAT	RH Parking Lamp, RH Position Lamp, RH Taillamp, Dimmer Control Switch, Chime Bell
EF21	10A	BAT	LH Parking Lamp, LH Position Lamp, LH Taillamp, License Lamp
EF22	15A	BAT	Engine Control Module
EF23	20A	BAT	Brake Switch, Brake Lamps, EBCM, Cruise Control, BTS2 Relay, BTS1 Solenoid
EF24	20A	BAT	Power Seat, Power Seat Control Switch
EF25	10A	EF34	Headlamp High LH
EF26	10A	EF34	Headlamp Low RH, Headlamp Leveling Motor RH
EF27	10A	EF15	Electric Outside Rearview Mirror Defogger
EF28	15A	BAT	Auto Door Lock System
EF29	10A	BAT	Siren, Automatic Antenna, Ign Key Illumination, Trunk Lamp, Room Lamp, Door Step Lamp, Power Window Motor, Keyless Entry System Unit
EF30	10A	EF34	Headlamp High RH
EF31	10A	EF34	Headlamp Low LH, Headlamp Leveling Motor LH
EF32	10A	EF7	Electric Outside Rearview Mirror Control, Map Lamp (w/o Sun Roof), Sun Roof Switch, Keyless Entry Unit
EF33	10A	BAT	A/C Compressor Relay, A/C Compressor, A/C Diode

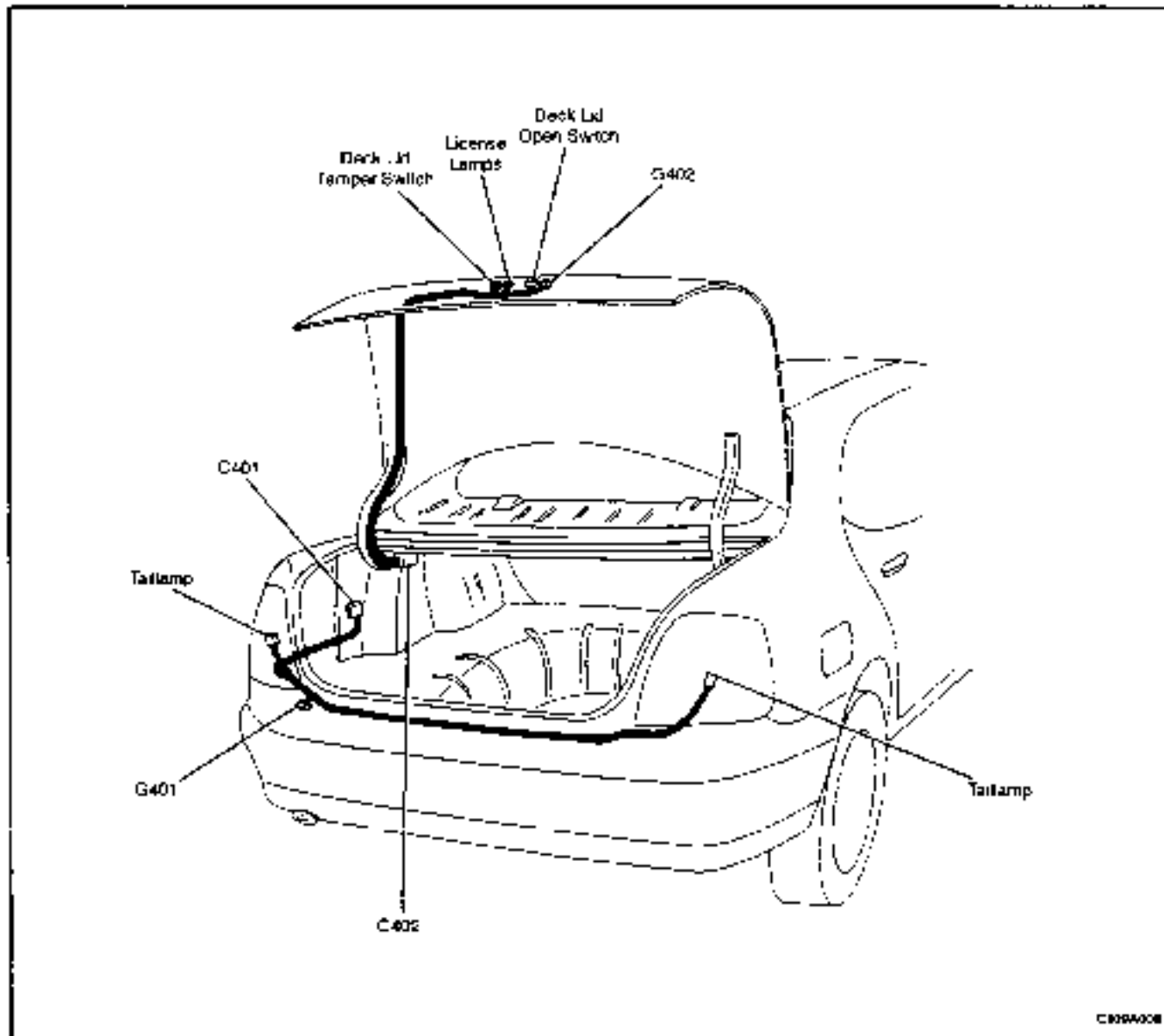
## FUSE CHART

Fuse	Rating/Source		Circuit
	Rating	Source	
EF34	25A	BAT	Headlamp Relay, EF30, EF25, LF31, EF26, High Beam Indicator Switch, Headlamp Switch, Illumination Relay, Headlamp Levering Switch
EF35	10A	BAT	Horn System
EF36	-	-	Blank
EF37	15A	BAT	Fog Lamp Relay, LH and RH Front Fog Lamps

## FUSE CHART (Cont'd)

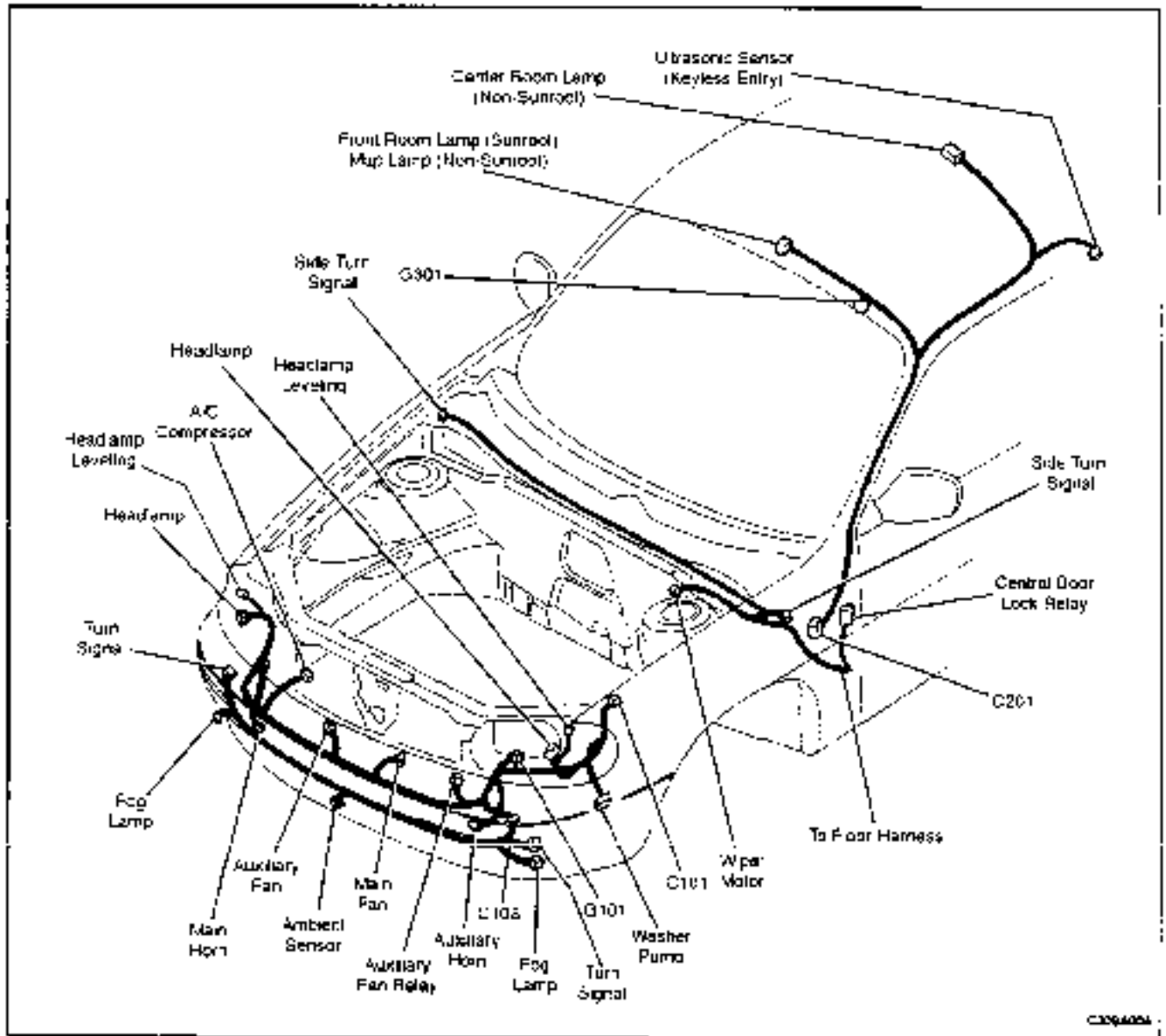
Fuse	Rating/Source		Circuit
	Rating	Source	
F1 (Fuse)	10A	EF1	Audio System, Clock, Key Remind Switch, Chime Bell, Ashtray Illum., Trunk Switch, Door Switch, ATC Controller
F2	10A	EF1	ALDL
F3	10A	EF1	Immobilizer
F4	20A	EF1	Daytime Running Lights
F5	10A	EF1	Rear Fog Lamp Relay, Rear Fog Lamps
F6	20A	EF5 (Ign 2)	Ign 2 Relay, Cooling Fan (High) Relay, Cooling Fan (Low) Relay, A/C Compressor Relay, A/C Switch, Cooling Fan Control Relay, ECM, Blower Motor Relay, Auto. Temp. Control Relay, Delogger Relay, ATC Controller
F8	20A	EF6 (Acc)	Cigar Lighter, Glove Box Lamp, Glove Box Switch
F9	10A	EF6 (Acc)	Audio System, Clock
F11	15A	EF6 (Ign 1)	Turn Signal/Hazard Switch
F12	25A	EF6 (Ign 1)	Wiper/Washer System
F13	15A	EF6 (Ign 1)	Engine Control Module, Ign 1 Relay, Vehicle Speed Sensor
F14	10A	EF6 (Ign 1)	Backup Switch, Backup Lamps, Delogger, ATC Controller, Seat Belt Switch
F15	10A	EF6 (Ign 1)	Supplemental Inflatable Restraint System
F16	20A	EF6 (Ign 1)	Sun Roof Module, Sun Roof Motor (if equipped)
F17	10A	EF6 (Ign 1)	Electronic Brake Control Module
F18	10A	EF6 (Ign 1)	Instrument Cluster, Chime Bell, Brake Switch, ATC Controller, Vehicle Speed Sensor, ECM, Brake Transaxle Shift Interlock Solenoid, PRND Switch, Speed Sensitive Power Steering Module, Ocular Switch Connector, EBCM

REAR HARNESS ROUTING



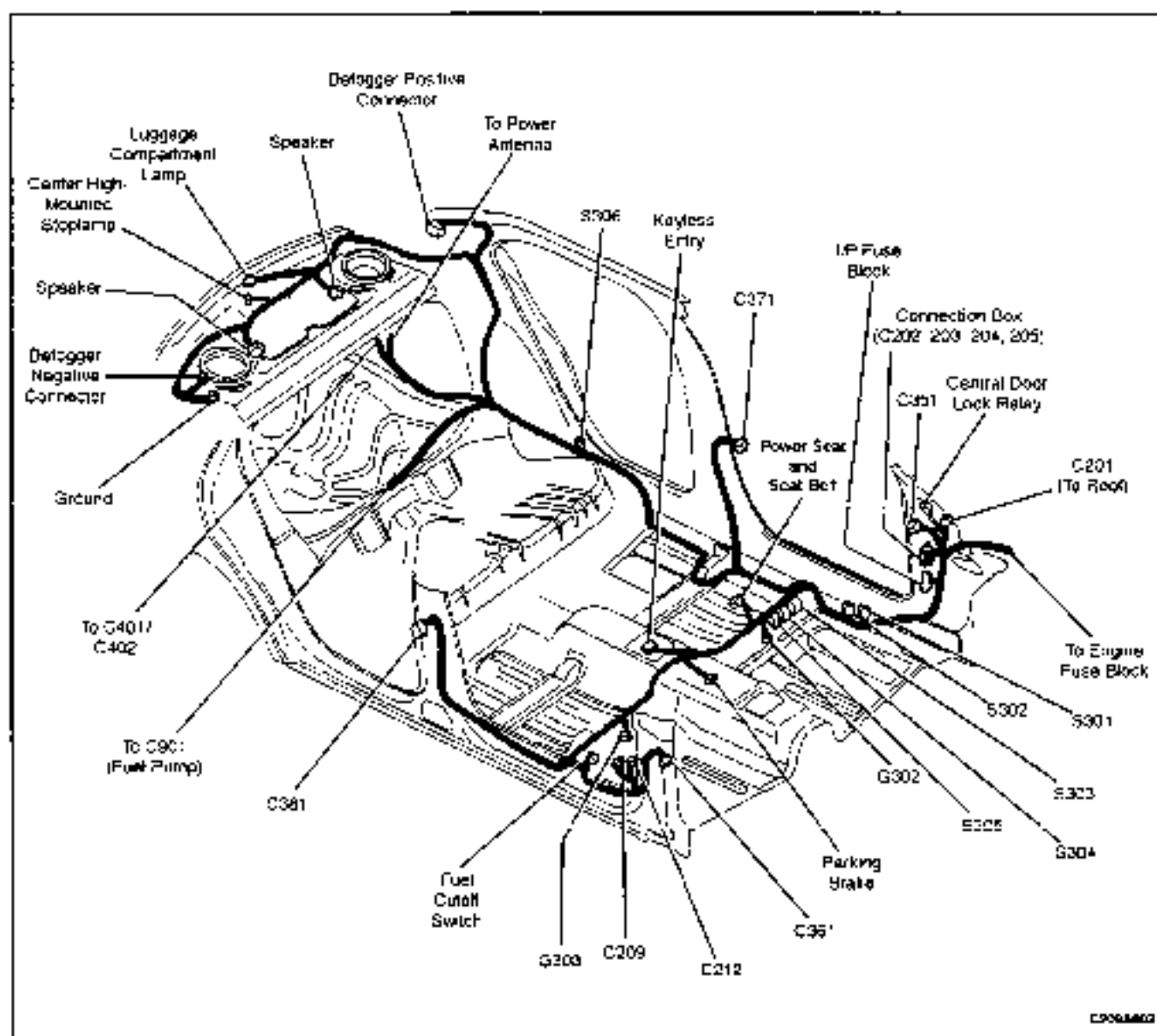


FRONT HARNESS ROUTING



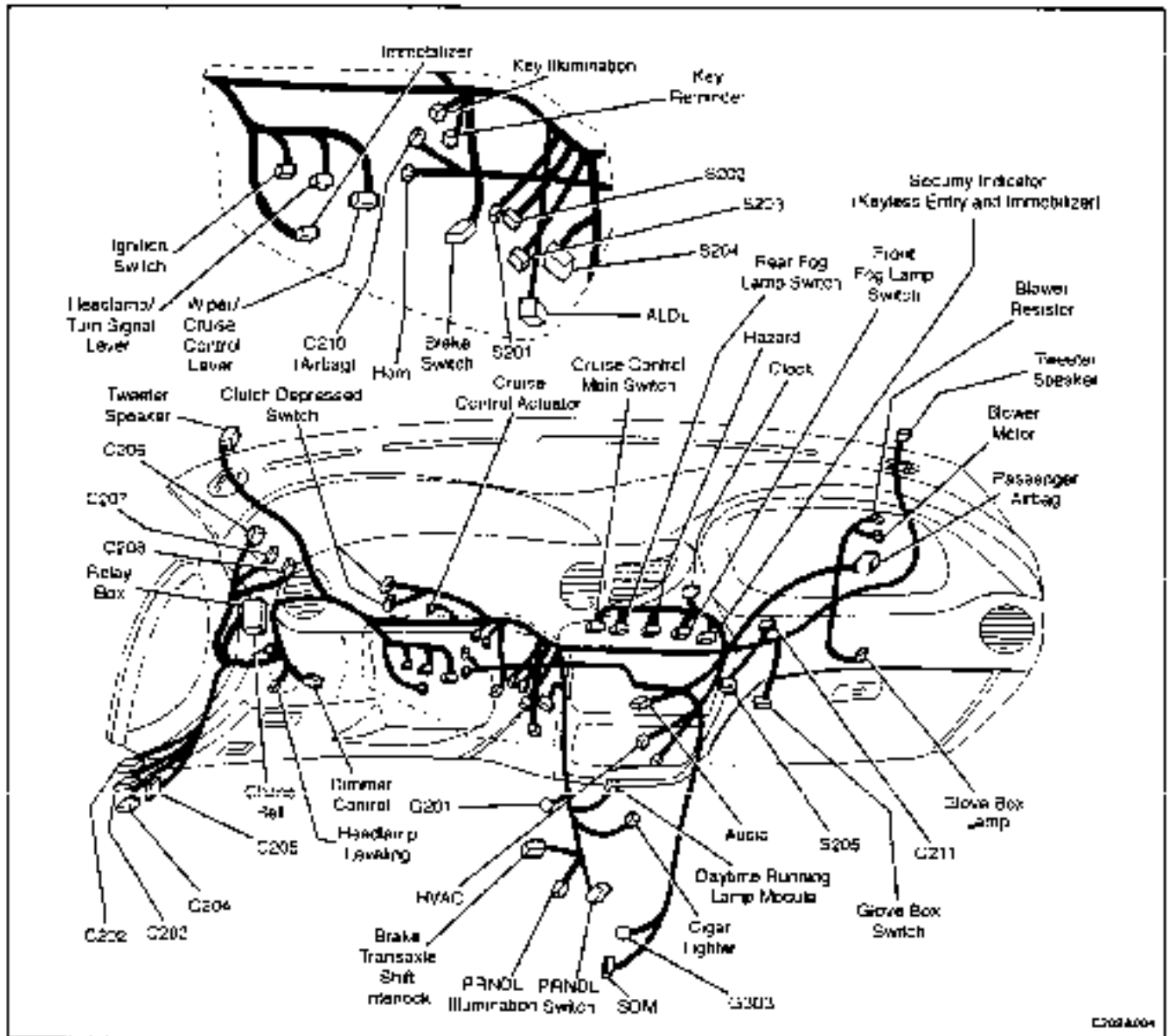
C3094004

## FLOOR HARNESS ROUTING



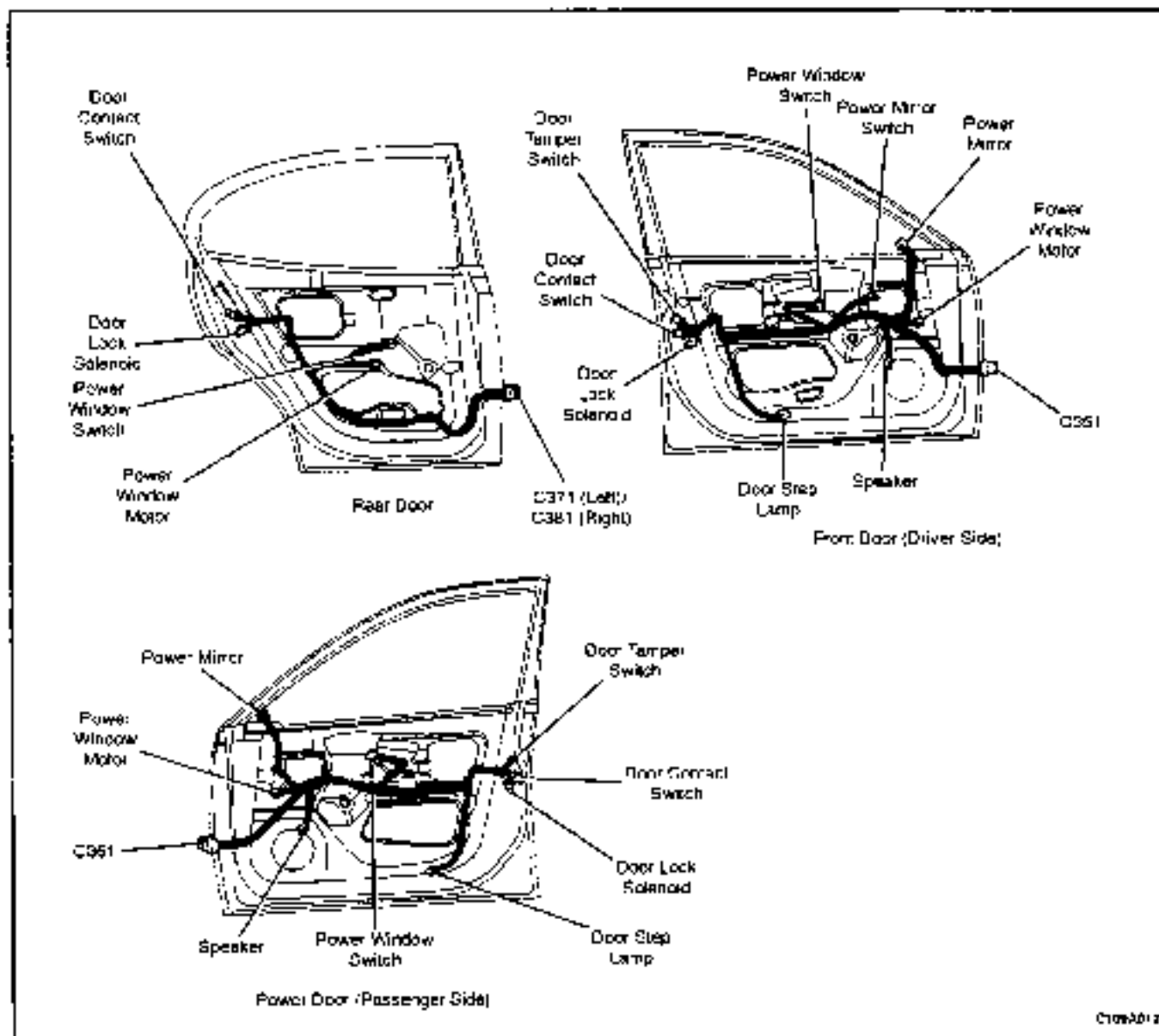
### INSTRUMENT HARNESS ROUTING

(Left-Hand Drive Shown, Right-Hand Drive Similar)



### DOOR HARNESS ROUTING

(Left-Hand Drive Shown, Right-Hand Drive Similar)



C106A017

## SECTION 9B

# LIGHTING SYSTEMS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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**SPECIFICATIONS****BULB USAGE CHART**

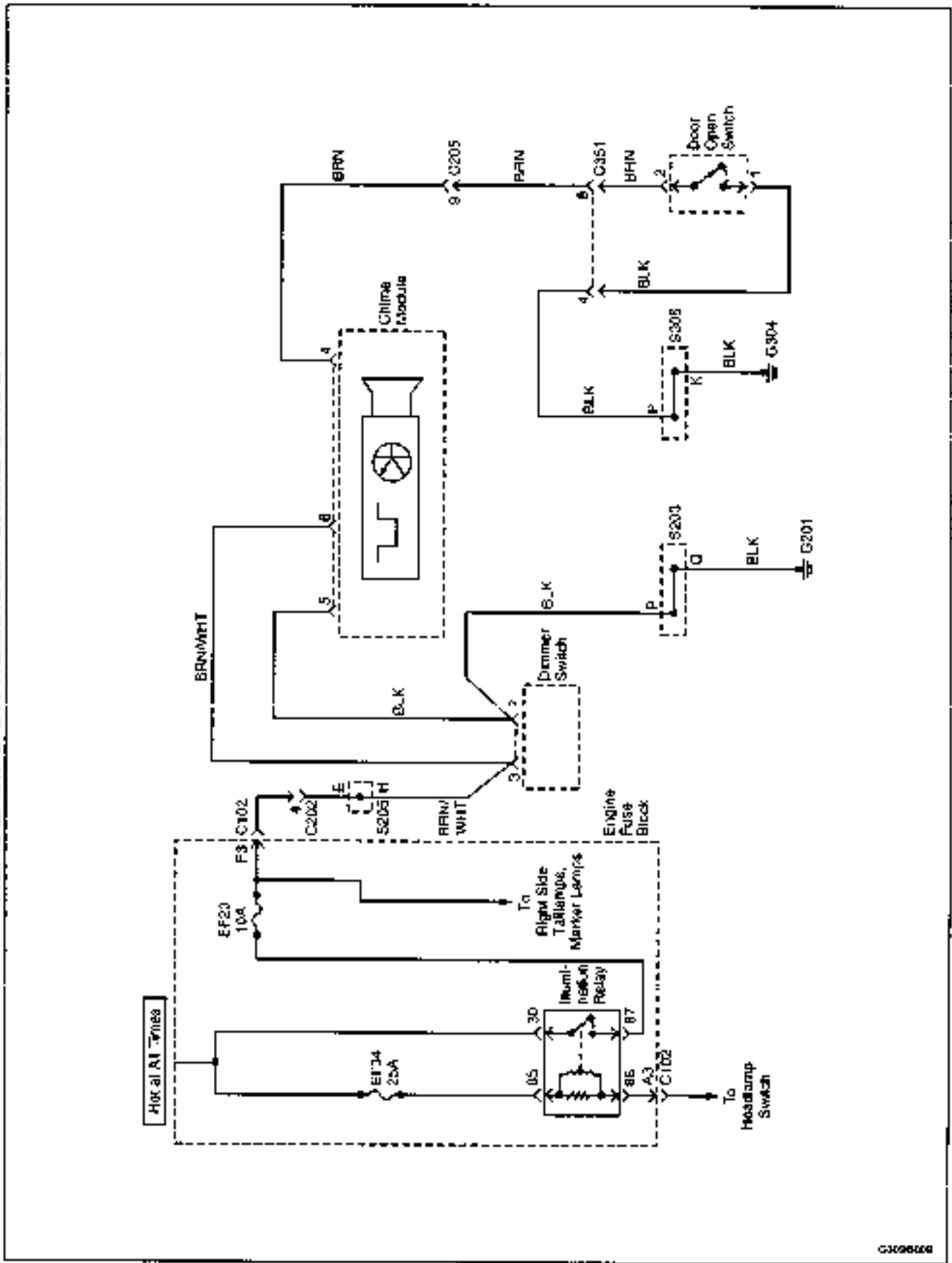
Bulb	Replacement Bulb Number
Ashtray Lamp	1.2W
Backup Lamp	21W
Center High-Mounted Stoplamp	21W
Cigar Lighter Lamp	5W
Front Door Step Lamp	5W
Front Fog Lamp	55W
Glove Box Lamp	5W
Headlamp	55W
Ignition Switch Keyhole Lamp	5W
Interior Courtesy Lamp	10W
License Plate Lamp	5W
Luggage Compartment Lamp	10W
Map Lamp	7.5W
Parking and Front Turn Signal Lamp	Double 21/5W
Rear Fog Lamp	21W
Tail/Stop/Turn Lamps	Double 21/5W
Vanity Mirror Lamp	3.5W

**FASTENER TIGHTENING SPECIFICATIONS**

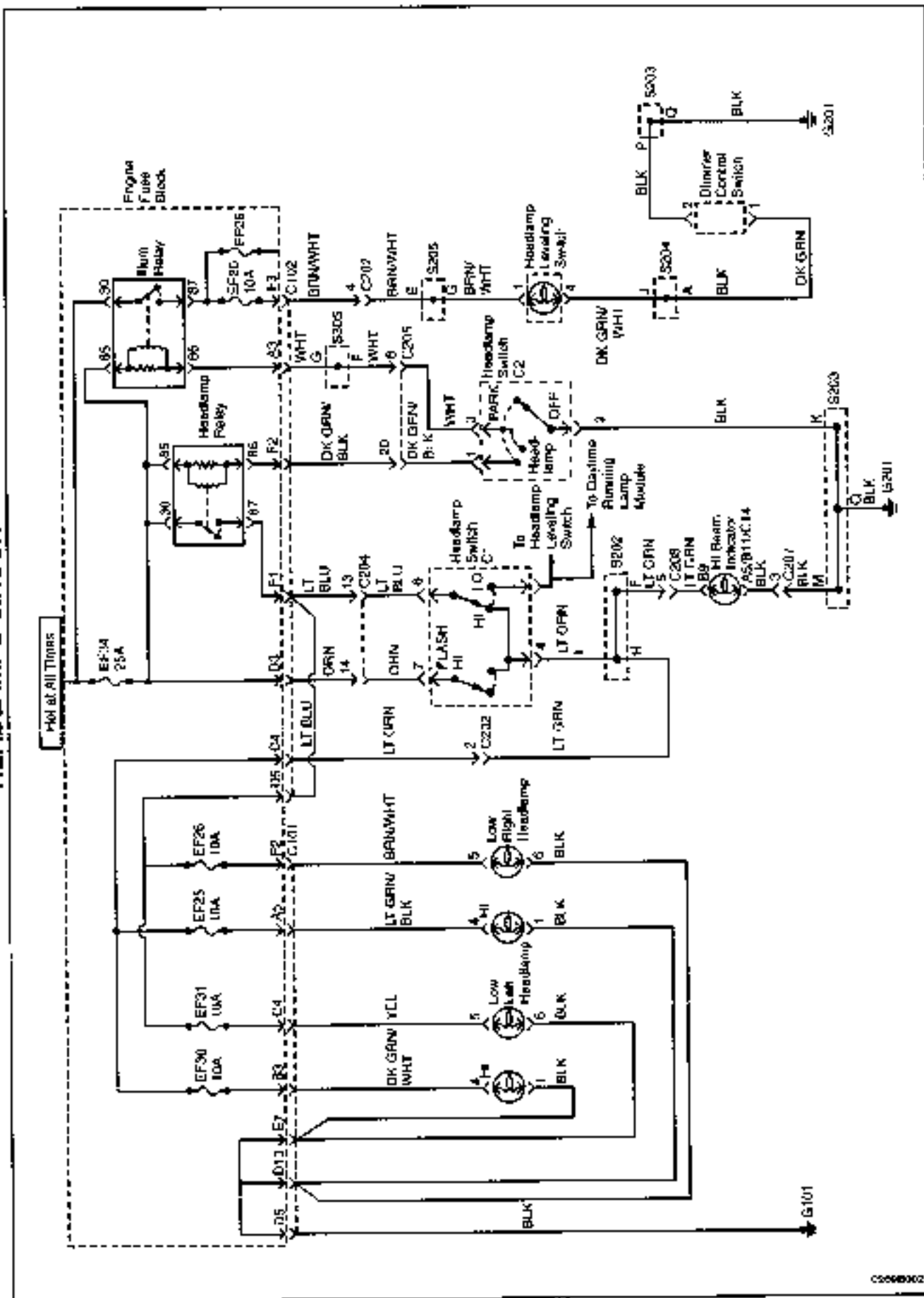
Application	N·m	Lb-Ft	Lb-In
Ashtray Housing Screws	2		18
Center High-Mounted Stoplamp Nuts	4	-	35
Daytime Running Lamp Module Screws	4	-	35
Front Door Trim Panel Screws	3.5	-	31
Front Fog Lamp Assembly Nuts	4	-	35
Front Turn Signal Lamp Screws	2	-	18
Headlamp Assembly Bolts	4	-	35
Ignition Switch Keyhole Lamp Screw	1.5	-	13
Interior Courtesy Lamp Housing Screw	2	-	18
License Plate Lamp Assembly Screws	2	-	18
Rear Combination Lamp Assembly Nuts	2	-	18
Steering Column Trim Cover Screws			

# SCHEMATIC AND ROUTING DIAGRAMS

## HEADLAMPS-ON REMINDER CHIME CIRCUIT



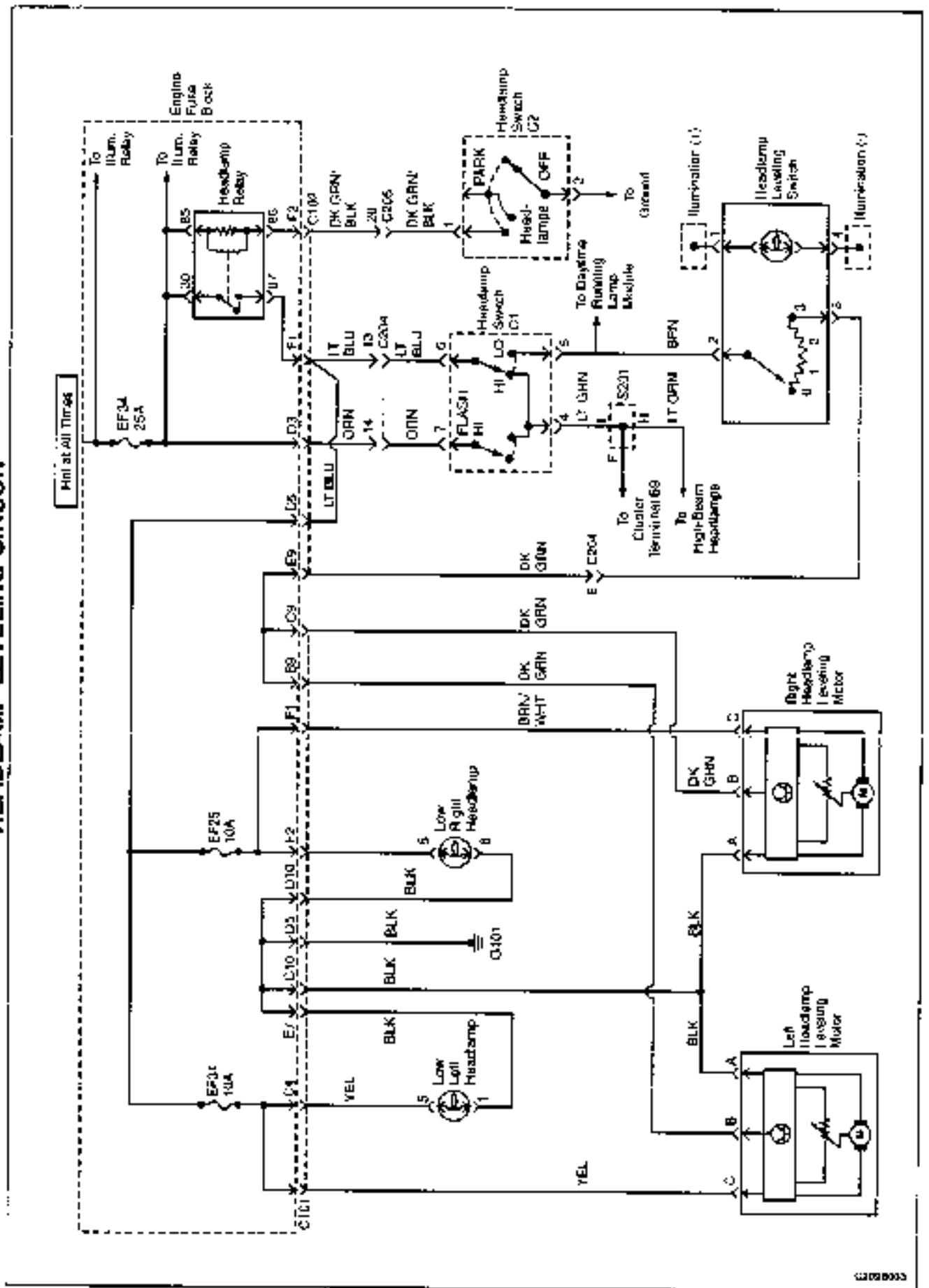
HEADLAMPS CIRCUIT



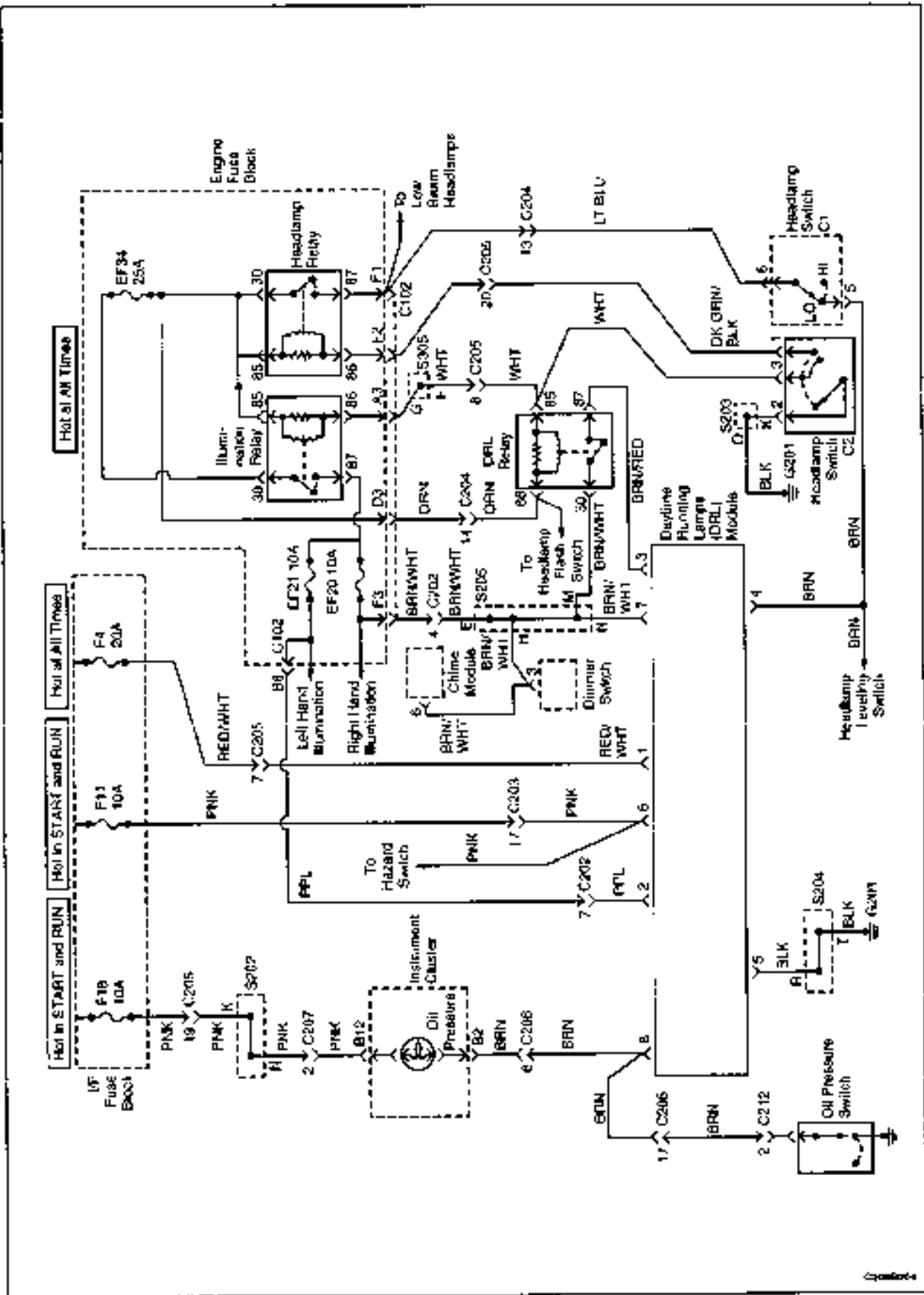
C566002



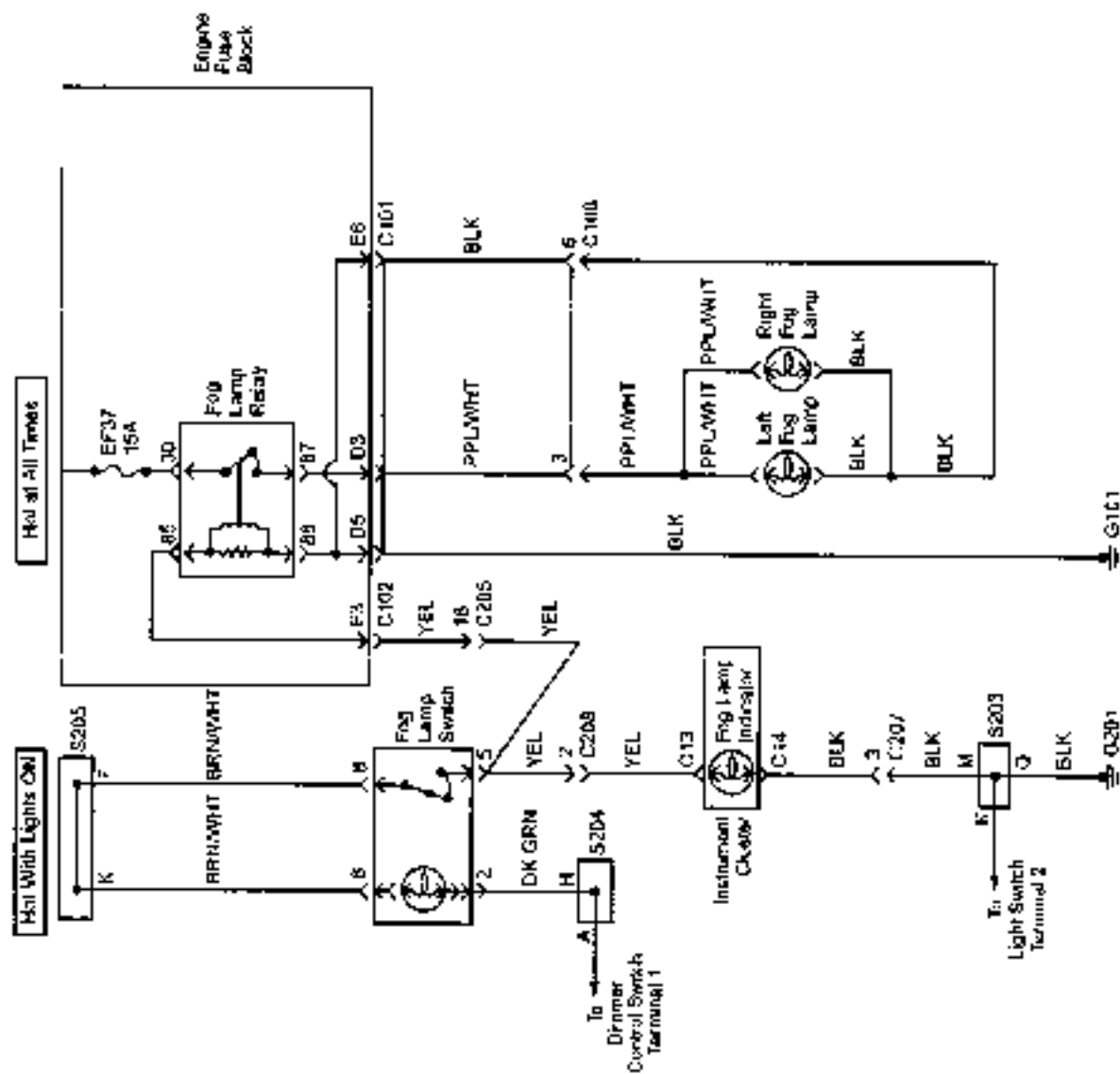
**HEADLAMP LEVELING CIRCUIT**



DAYTIME RUNNING LAMPS CIRCUIT

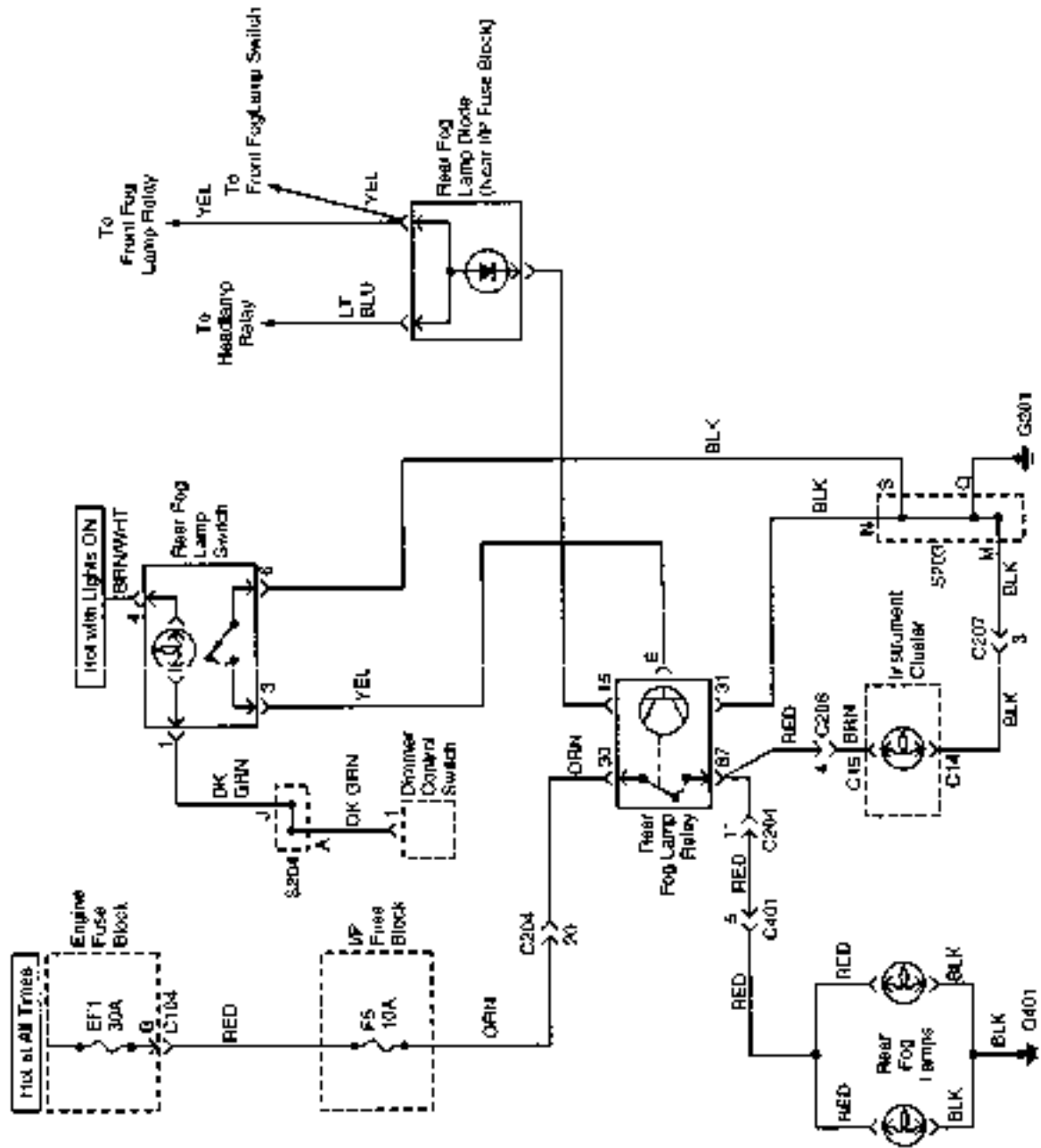


FRONT FOG LAMPS CIRCUIT



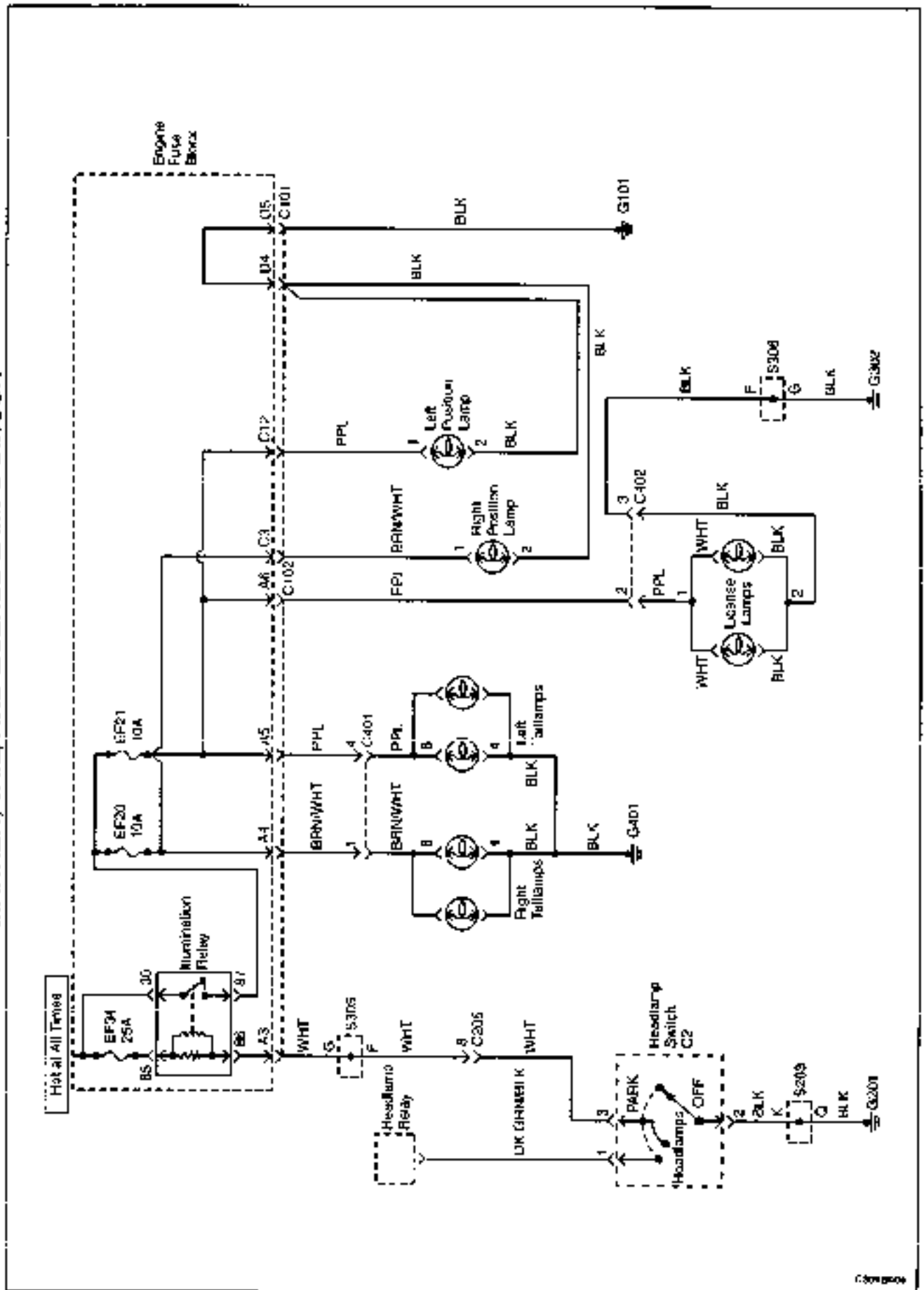
C104B421

REAR FOG LAMPS CIRCUIT

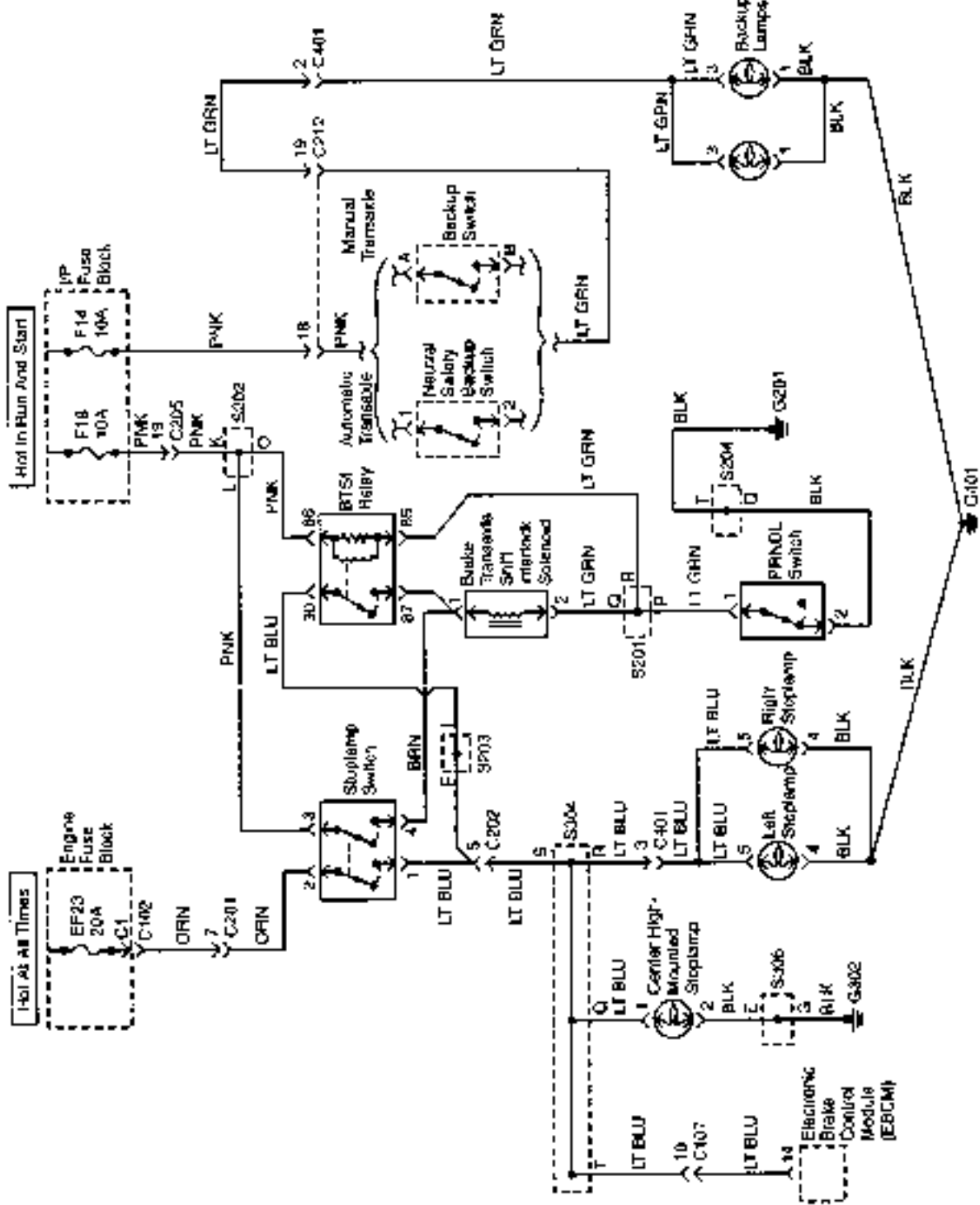


CANADIAN

MARKER, TAIL, AND LICENSE LAMPS CIRCUIT

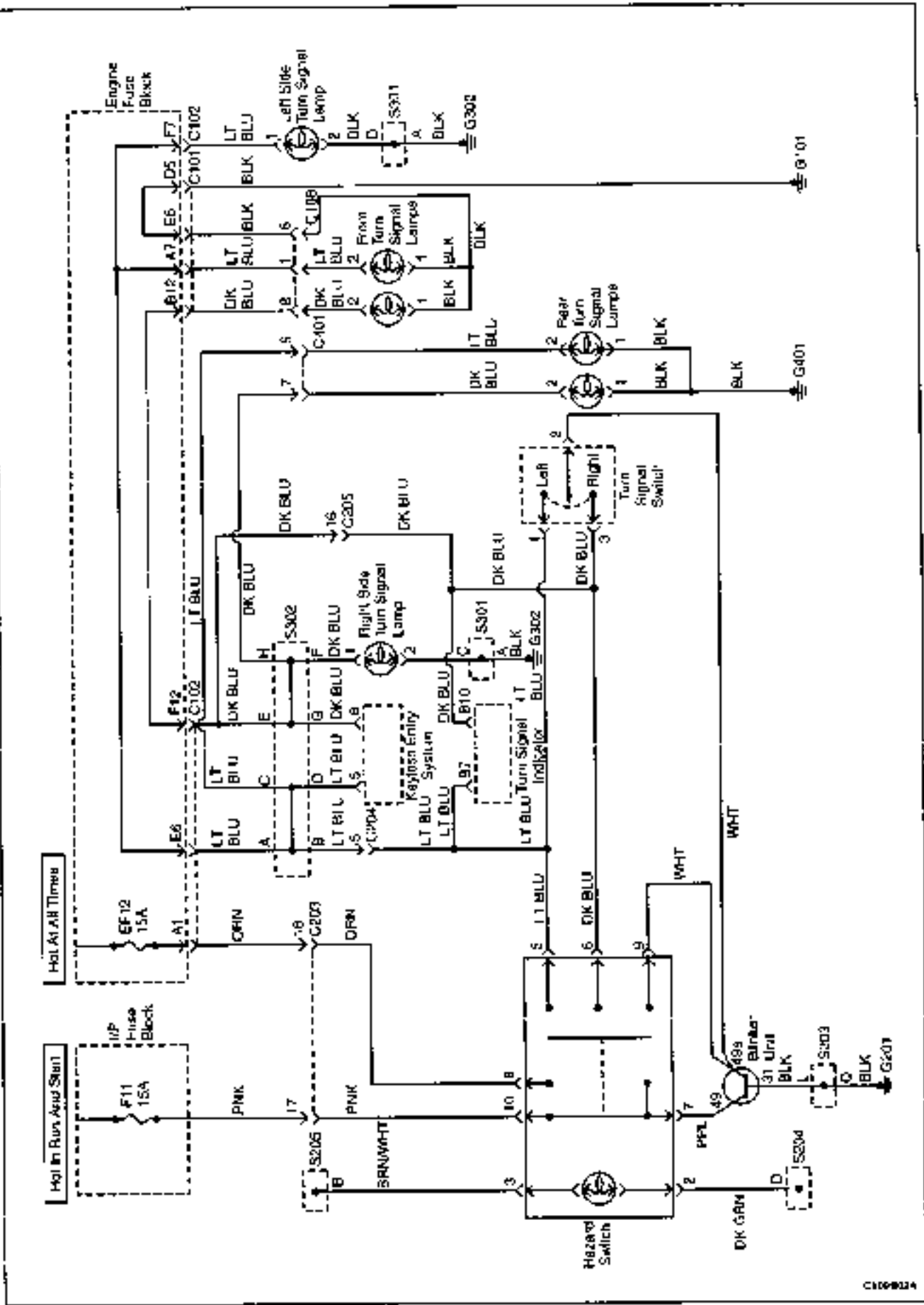


STOPLAMPS AND BACKUP LAMPS CIRCUIT



C308606

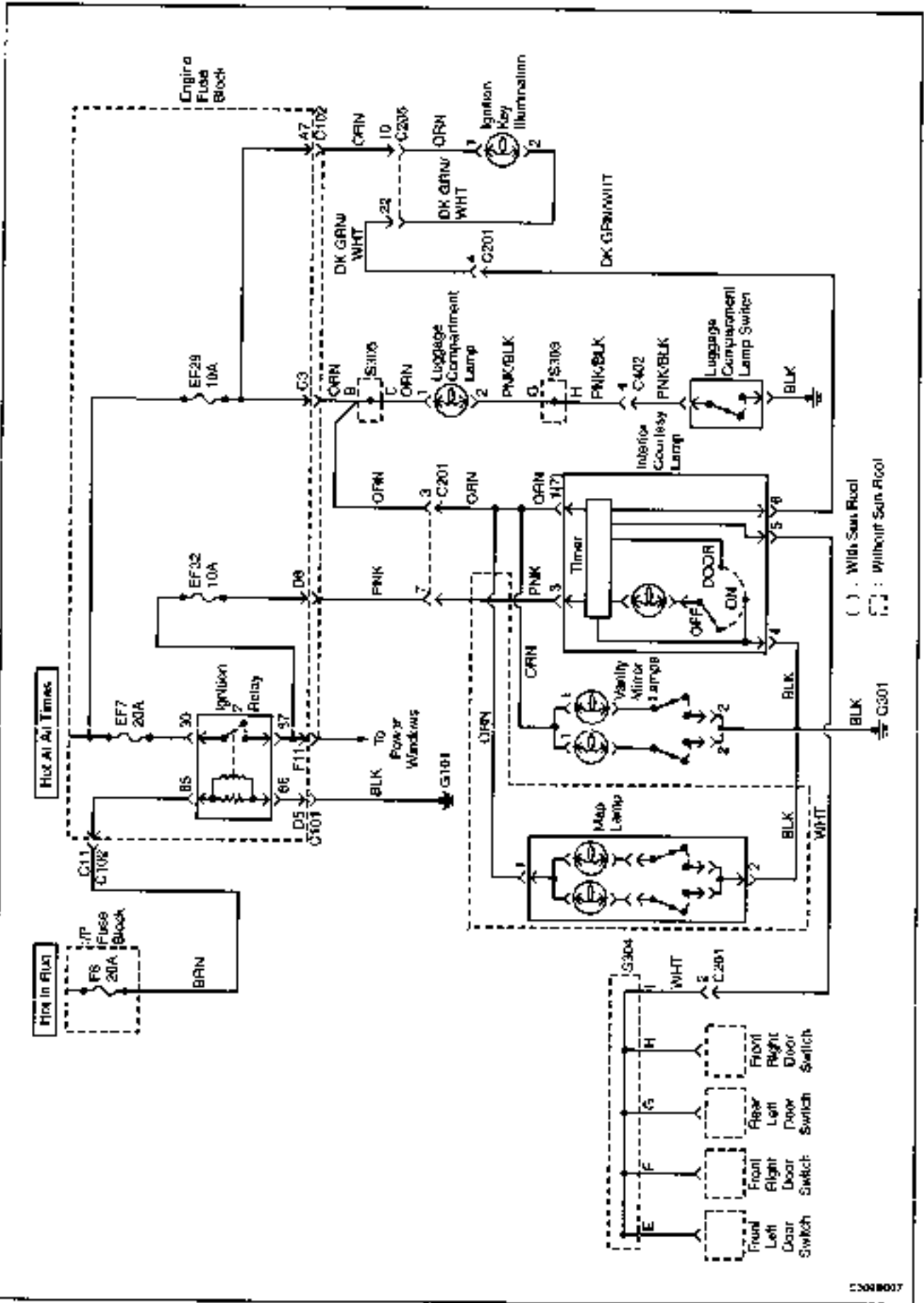
TURN AND HAZARD LAMPS CIRCUIT



C100-9024

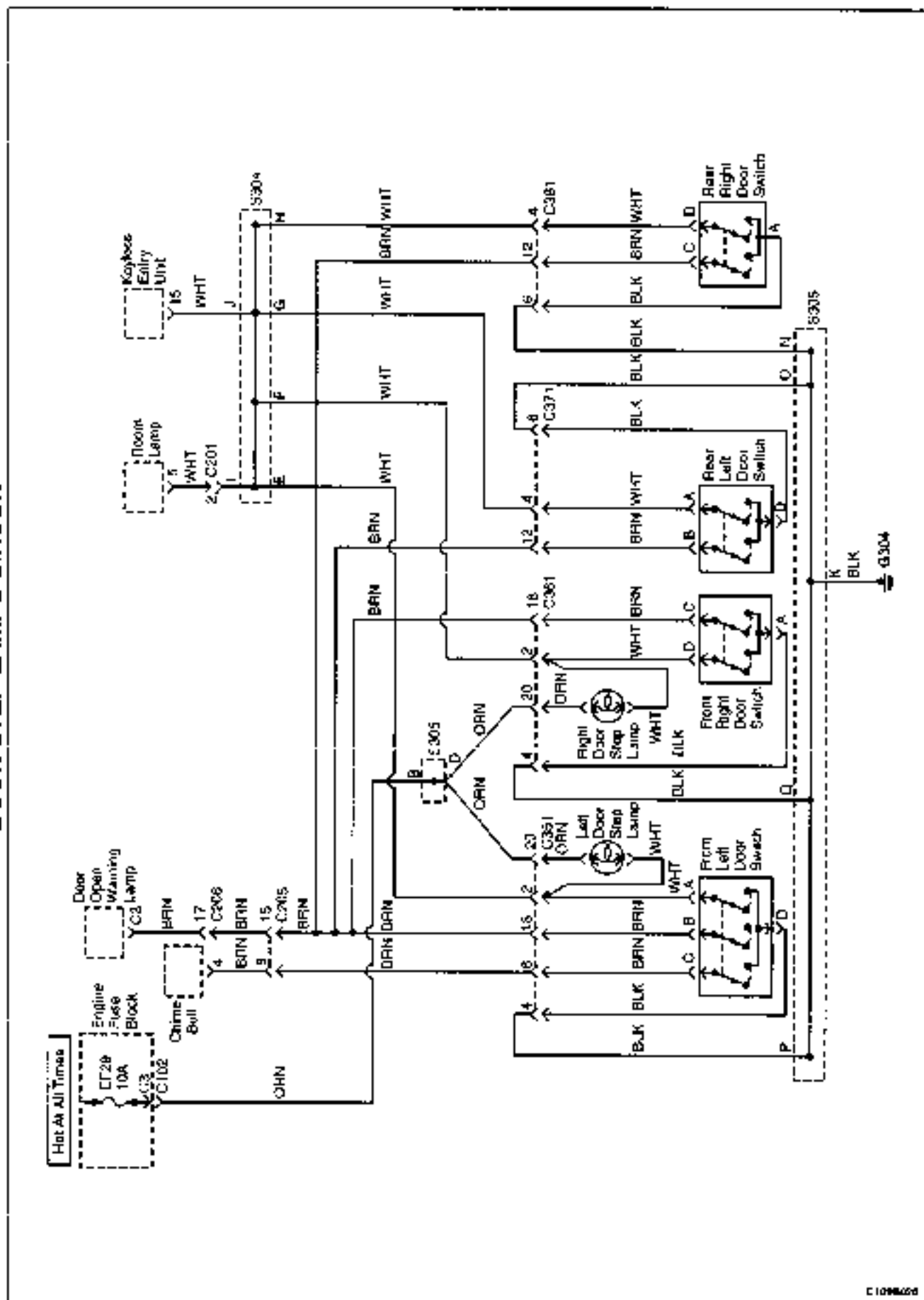
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INTERIOR COURTESY AND LUGGAGE COMPARTMENT LAMPS CIRCUIT

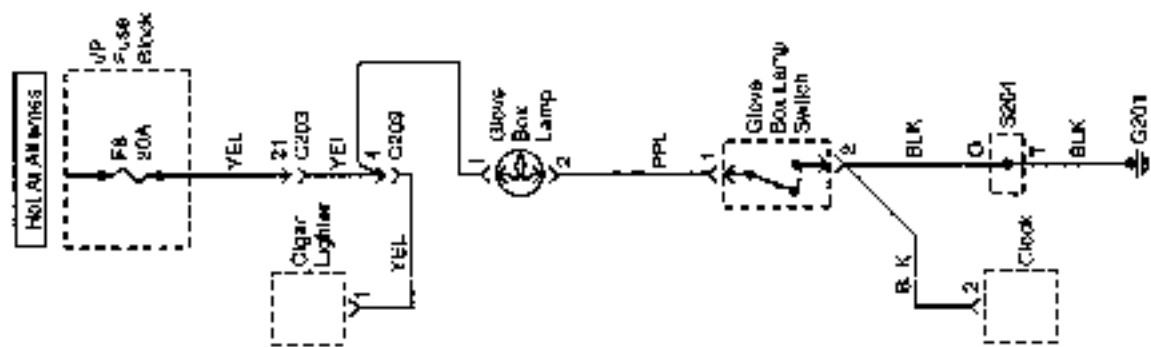




DOOR STEP LAMPS CIRCUIT

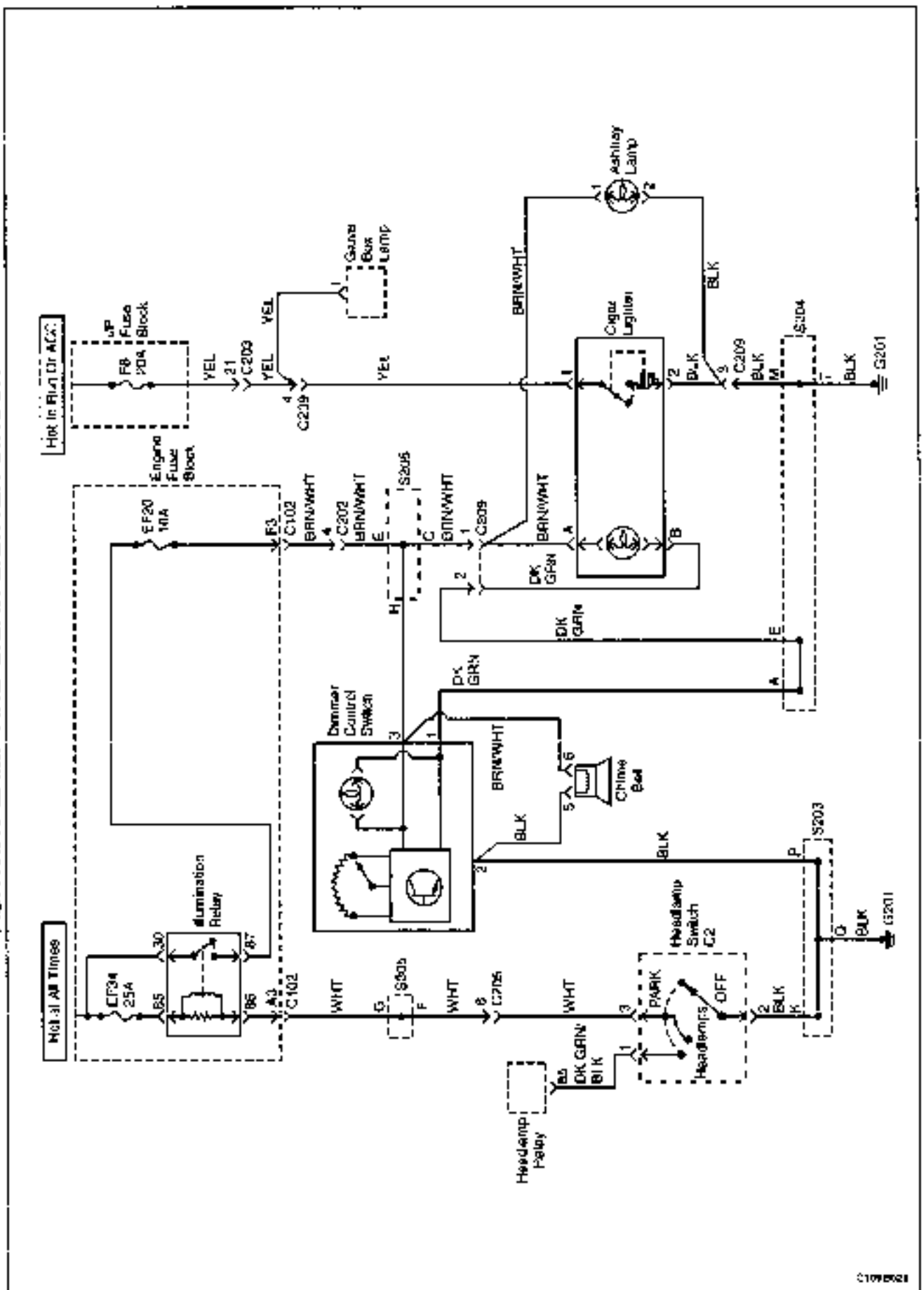


GLOVE BOX LAMP CIRCUIT



C1038027

ASHTRAY LAMP AND CIGAR LIGHTER CIRCUIT



C1095021

## DIAGNOSIS

### HEADLAMPS-ON REMINDER CHIME

#### Diagnostic Aids

Fuse EF20 controls the instrument cluster lighting and the right side tailamps, parking lamps, and marker lamps. It also provides the input to the chime module for the lighting reminder.

#### Test Description

The number(s) below refer to step(s) on the diagnostic table.

- The chime module is under the instrument panel on the left side.

#### Headlamps-On Reminder Chime Is Inoperative

Step	Action	Value(s)	Yes	No
1	1. Turn the parking lamps and the tailamps ON. 2. Verify that the parking and tail amps are working on the right side of the vehicle. Are the parking amps and tailamps working on the right side of the vehicle?	-	Go to Step 3	Go to Step 2
2	Repair the parking lamps and the tailamps before completing this diagnostic table. Does the headlamps reminder chime work after the parking lamps and the tailamps have been repaired?	-	System OK	Go to Step 3
3	1. Disconnect the chime module electrical connector. 2. Turn the headlamps ON. 3. Check the voltage at terminal 6 of the chime module connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 7	Go to Step 4
4	1. Remove the headlamp leveling and dimmer switch from the instrument panel for testing, but do not disconnect the electrical connector. 2. Turn the headlamps ON. 3. Check the voltage at the BRN/WHT wire at the dimmer switch connector (3-pin connector). Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 6
5	Repair the open BRN/WHT wire between the dimmer switch connector and the chime module connector. Is the repair complete?	-	System OK	-
6	Repair the open circuit between fuse EF20 and the dimmer switch. Is the repair complete?	-	System OK	-
7	Use an ohmmeter to check the continuity between ground and terminal 5 of the chime module connector. Does the ohmmeter indicate the specified value?	= 0 Ω	Go to Step 9	Go to Step 8
8	Repair the open circuit between ground and terminal 5 of the chime module connector. Is the repair complete?	-	System OK	-
9	1. Open the driver door. 2. Connect an ohmmeter between ground and terminal 4 of the chime module connector. Does the ohmmeter indicate the specified value?	= 0 Ω	Go to Step 11	Go to Step 10

## Headlamps-On Reminder Chime Is Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
10	Repair the open circuit between ground and terminal 4 of the chime module connector. (The door open switch should be closed when the door is open.) Is the repair complete?	-	System OK	-
11	Replace the chime module. Is the repair complete?	-	System OK	-

## HEADLAMPS

## Low-Beam Headlamps Are Inoperative, High-Beam Headlamps Are OK

Step	Action	Value(s)	Yes	No
1	Check fuses EF26 (left side headlamps) and EF31 (right side headlamps). Are fuses EF26 or EF31 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	Check the voltage at fuses EF26 and EF31. Does the voltage available at fuses EF26 and EF31 equal the value specified?	11-14 v	Go to Step 4	Go to Step 3
4	1. Disconnect both headlamp connectors. 2. Turn the headlamps on. 3. Select the low beams. Does the voltage at each headlamp connector terminal 5 equal the value specified?	11-14 v	Go to Step 6	Go to Step 5
5	Repair the open circuit between fuses EF26 or EF31 and the low beam headlamps. Is the repair complete?	-	System OK	-
6	1. Disconnect the headlamp connectors. 2. Connect an ohmmeter between ground and either headlamp connector terminal 1. Is the resistance equal to the value specified?	0 $\Omega$	Go to Step 8	Go to Step 7
7	Repair the ground circuit. Is the repair complete?	-	System OK	-
8	Replace the faulty headlamps. Is the repair complete?	-	System OK	-
9	Check the voltage between fuses EF31 or EF26 and the headlamp relay. Does the voltage available at fuses EF31 and EF26 equal the specified value?	11-14 v	System OK	Go to Step 10
10	Repair the open circuit between fuses EF31 and EF26 and the headlamp relay. Is the repair complete?	-	System OK	-

## High-Beam Headlamps Are Inoperative, Low-Beam Headlamps Are OK

Step	Action	Value(s)	Yes	No
1	1. Turn the high-beam headlamps on. 2. Check the voltage at headlamp switch C1 terminal 6 with high beams selected. Does the voltage available at the headlamp switch C1 terminal 6 equal the value specified?	11-14 v	Go to Step 3	Go to Step 2
2	Repair the open circuit between fuse EF34 and the headlamp switch C1. Is the repair complete?	-	System OK	-
3	Check fuses EF30 and EF25. Is fuse EF30 or EF25 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit. Repair it if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
5	1. Disconnect the headlamp switch. 2. Put the switch in the high-beam position. 3. Use an ohmmeter to check the continuity of the headlamp switch C1 between terminals 6 and 4. Does the ohmmeter indicate the specified value?	0 $\Omega$	Go to Step 7	Go to Step 6
6	Replace the headlamp switch. Is the repair complete?	-	System OK	-
7	1. Disconnect the high-beam headlamp connectors. 2. Turn the high-beam headlamps on. 3. Use a voltmeter to check the voltage at terminal 4 of the headlamp connectors. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between the fuse block and the high-beam headlamps. Is the repair complete?	-	System OK	-
9	Use an ohmmeter to check continuity between terminal 6 of the headlamp connectors and ground. Does the ohmmeter indicate the specified value?	= 0 $\Omega$	Go to Step 11	Go to Step 10
10	Repair the open ground circuit. Is the repair complete?	-	System OK	-
11	Replace the faulty high-beam headlamps. Is the repair complete?	-	System OK	-

### High-Beam and Low-Beam Headlamps Are Inoperative on Both Left and Right Sides

**Diagnostic Aids:** If there are several other systems inoperative with the ignition ON, such as power windows, power seats, sunroof, and front turn signals, check ground G101.

Step	Action	Value(s)	Yes	No
1	Check fuses EF34, EF30, EF25, EF31, and EF26. Are any fuses blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?	-	System OK	-
3	Use a voltmeter to check voltage at EF 34. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit to fuses EF34. Is the repair complete?	-	System OK	-
5	Turn the headlamps ON. Are the parking lamps, tail lamps, and license lamps working?	-	Go to Step 6	Go to Step 6
6	Temporarily substitute the illumination relay in place of the headlamp relay. Do the headlamps operate with the substituted relay?	-	Go to Step 7	Go to Step 8
7	1. Reinstall the illumination relay in its original position. 2. Replace the headlamp relay. Is the repair complete?	-	System OK	-
8	1. Disconnect the headlamp connectors, and use an ohmmeter to check continuity between terminals 1 and 6 and ground. Repeat this procedure on the other side. 2. Connect the headlamp connectors. Does the ohmmeter indicate the specified value between each terminal and ground?	$\rightarrow 0 \Omega$	Go to Step 10	Go to Step 9
9	Repair the open circuit between the headlamps and ground. Is the repair complete?	-	System OK	-
10	1. Disconnect headlamp switch connector C2 2. Turn the headlamps ON. 3. Using a voltmeter, check voltage at headlamps switch connector C2 terminal 1 (harness side). Is the voltage equal to the specified value?	11-14 v	Go to Step 12	Go to Step 11
11	Repair the open circuit between fuse EF34 and the headlamp switch C2. Is the repair complete?	-	System OK	-
12	Use an ohmmeter to check continuity between headlamp switch connector C2, terminal 2 (harness side) and ground. Did the ohmmeter indicate the specified value?	$\rightarrow 0 \Omega$	Go to Step 14	Go to Step 13
13	Repair the open circuit between headlamp switch connector C2 and ground. Is the repair complete?	-	System OK	-
14	Replace the headlamp switch. Is the repair complete?	-	System OK	-

### HEADLAMP LEVELING

**Test Description**

The number(s) below refer to step(s) on the diagnostic table.

9. The headlamp leveling switch can be removed for testing if the driver side instrument panel cover is

carefully pulled loose from its retaining clips. By reaching behind the loosened trim panel, the retaining tabs for the headlamp leveling and dimmer switch can be pressed to release the switch from the instrument panel.

**Headlamp Leveling Is Inoperative**

Step	Action	Value(s)	Yes	No
1	Check the high- and the low-beam headlamps. Do the high- and the low-beam headlamps work?	-	Go to Step 3	Go to Step 2
2	Repair the high- and the low-beam headlamps before completing this diagnostic table. Does the leveling system operate after the headlamps have been repaired?	-	System OK	Go to Step 3
3	1. Disconnect the connector at the inoperative headlamp leveling motor. 2. Turn the low-beam headlamps ON. 3. Check the voltage at the YEL wire at the left headlamp leveling motor connector (or the BRN/WHT wire at the right headlamp leveling motor connector). Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open circuit between the low-beam headlamp and the headlamp leveling motor. Is the repair complete?	-	System OK	-
5	Use an ohmmeter to check continuity between the BLK wire at the headlamp leveling motor connector and ground. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 7	Go to Step 6
6	Repair the open circuit between the headlamp leveling motor connector and ground. Is the repair complete?	-	System OK	-
7	1. Turn the low beam headlamps ON. 2. At the headlamp leveling motor connector, check the voltage while the leveling adjustment is changed from "0" to "3" on the leveling switch. Does the voltage change smoothly and match the values specified?	11-14 v at position "0" to 4.5 v at position "3"	Go to Step 8	Go to Step 9
8	Replace the headlamp leveling motor. Is the repair complete?	-	System OK	-
9	1. Remove the headlamp leveling switch for testing, but do not disconnect the electrical connector. 2. Turn the low-beam headlamps ON. 3. Check the voltage at the BRN wire at the headlamp leveling switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 13	Go to Step 10
10	1. Remove the headlamp switch for testing, but leave the electrical connectors connected. 2. Turn the low-beam headlamps ON. 3. Check the voltage at the BRN wire at the headlamp and turn signal switch seven-pin connector. Does the voltage equal the specified value?	11-14 v	Go to Step 12	Go to Step 11



## Headlamp Leveling Is Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
11	Replace the headlamp switch. Is the repair complete?	-	System OK	-
12	Repair the open circuit in the BRN wire between the headlamp switch and the headlamp leveling switch. Is the repair complete?	-	System OK	-
13	1. Turn the low-beam headlamps ON. 2. With the headlamp leveling switch removed for testing and the electrical connector still connected, check the voltage at the DK GRN wire at the headlamp leveling switch with the switch dial set at "0." Does the voltmeter indicate the specified value?	11-14 v	Go to Step 15	Go to Step 14
14	Replace the headlamp leveling switch. Is the repair complete?	-	System OK	-
15	1. Turn the low-beam headlamps ON. 2. With the headlamp leveling switch removed for testing and the electrical connector still connected, check the voltage at the DK GRN wire at the headlamp leveling switch as the switch is dialed to "3." Does the voltmeter smoothly drop to about 4.5 volts less than in Step 13?	-	Go to Step 16	Go to Step 14
16	Repair the open DK GRN wire between the headlamp leveling switch and the headlamp leveling motors. Is the repair complete?	-	System OK	-

## DAYTIME RUNNING LAMPS

### Diagnostic Aids

The daytime running lamp (DRL) system will not work if the oil pressure indicator light is on. The system is designed to work only when the engine is running, and that

condition is signalled by the oil pressure switch. If the oil pressure switch wire is shorted to ground or the switch stays closed when the engine is running, the DRL system will not work.

### Daytime Running Lamps Do Not Turn ON

Step	Action	Value(s)	Yes	No
1	Turn the headlamps ON with the headlamp switch. Do the headlamps, parking lamps, tail lamps and instrument lamps work?	-	Go to Step 3	Go to Step 2
2	Repair the regular headlamp system before completing this diagnostic table. Does the DRL system work after the headlamps, exterior lamps, and instrument lamp systems have been repaired?	-	System OK	Go to Step 3
3	Check fuses F11 and F4. Is fuse F11 or F4 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse(s). Is the repair complete?	-	System OK	-
5	1. Turn the ignition ON. 2. Check the voltage at fuses F11 and F4. Does the voltage equal the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the power supply circuit for fuse F11 and/or F4. Is the repair complete?	-	System OK	-
7	1. Disconnect the electrical connector from the DRL module. 2. Turn the ignition ON. 3. Check the voltage at terminal 6 of the DRL module. Is the voltage equal to the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between fuse F11 and terminal 6 of the DRL module connector. Is the repair complete?	-	System OK	-
9	With the electrical connector still disconnected from the DRL module, check the voltage at terminal 1 of the DRL module. Is the voltage equal to the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the open circuit between fuse F4 and terminal 1 of the DRL module connector. Is the repair complete?	-	System OK	-
11	With the DRL module still disconnected, use an ohmmeter to check the resistance between ground and terminal 5 of the DRL module connector. Is the resistance equal to the specified value?	$\approx 0 \Omega$	Go to Step 13	Go to Step 12
12	Repair the circuit between ground and terminal 5 of the DRL module connector. Is the repair complete?	-	System OK	-

## Daytime Running Lamps Do Not Turn ON (Cont'd)

Step	Action	Value(s)	Yes	No
13	1. Start the engine. 2. Observe the oil pressure warning lamp. Is the oil pressure indicator lamp on?	-	Go to Step 14	Go to Step 17
14	Disconnect the oil pressure switch. Start the engine. Is the oil pressure indicator lamp still on?	-	Go to Step 15	Go to Step 16
15	Repair the wire shorted to ground between the oil pressure switch or indicator lamp and terminal 8 of the DRL module. Is the repair complete?	-	System OK	-
16	1. Determine whether the problem is low oil pressure or a faulty switch. 2. Repair the mechanical problem or replace the oil pressure switch as necessary. Is the repair complete?	-	System OK	-
17	1. Make sure the headlamps are turned OFF. 2. With the DRL module disconnected, turn the ignition ON. 3. Check the voltage at terminal 3 of the DRL module. Is the voltage equal to the specified value?	-0 v	Go to Step 19	Go to Step 18
18	Repair the short to voltage between the DRL relay terminal 87 and terminal 3 of the DRL module. Is the repair complete?	-	System OK	-
19	1. With the DRL module disconnected, turn the ignition ON. 2. Turn the headlamps ON. 3. Check the voltage at terminal 4 of the DRL module connector. Does the voltage equal the specified value?	11-14 v	Go to Step 21	Go to Step 20
20	Repair the open circuit between terminal 4 of the DRL module connector the headlamp switch terminal 5. Is the repair complete?	-	System OK	-
21	Replace the DRL module. Is the repair complete?	-	System OK	-

## FOG LAMPS

## Front Fog Lamps Inoperative

Step	Action	Value(s)	Yes	No
1	Check fuse EF37 Is EF37 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary 2. Replace the fuse Is the repair complete?	-	System OK	-
3	Use a voltmeter or test lamp to check fuse EF37. Does the battery voltage available at fuse EF37 equal the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open circuit from the battery to fuse EF37. Is the repair complete?	-	System OK	-
5	Remove the fog lamp relay and temporarily substitute a known good relay such as the headlamp relay or the illumination lamp relay. Do the fog lamps work with the substituted relay?	-	Go to Step 6	Go to Step 7
6	1. Return the substituted relay to its original position. 2. Replace the inoperative fog lamp relay. Is the repair complete?	-	System OK	-
7	1. Return the substituted relay to its original position, but do not reinstall the fog lamp relay. 2. Using a voltmeter or test lamp, check the fog lamp relay socket terminal 87. Does the battery voltage available at the fog lamp relay socket equal the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between fuse EF37 and the fog lamp relay. Is the repair complete?	-	System OK	-
9	At the fog lamp relay socket, use an ohmmeter or test lamp to verify that the connector for relay terminal 36 is connected to ground. Does the resistance equal the specified value?	0 $\Omega$	Go to Step 11	Go to Step 10
10	Repair the ground circuit for the fog lamp relay. Is the repair complete?	-	System OK	-
11	With the fog lamp relay reinstalled and the switch on test for voltage at the fog lamp connector Does the battery voltage available at the fog lamp connector equal the specified value?	11-14 v	Go to Step 13	Go to Step 12
12	Repair the open circuit between the fog lamp relay terminal 87 and the fog lamps. Is the repair complete?	-	System OK	-
13	Use an ohmmeter or test lamp to check the ground at the ground side of the fog lamp connector. Does the resistance equal the specified value?	0 $\Omega$	Go to Step 15	Go to Step 14
14	Repair the fog lamp ground circuit. Is the repair complete?	-	System OK	-
15	Replace the faulty fog lamp bulbs Is the repair complete?	-	System OK	-

### Rear Fog Lamps Are Inoperative

#### Diagnostic Aids

The rear fog lamps will not operate unless the headlamps or the front fog lamps are on.

The rear fog lamp indicator in the instrument cluster can shorten the diagnostic process. If the instrument cluster indicator comes on, but the rear fog lamps do not come on, the problem is either an open circuit between the rear fog lamp relay and the lamps, faulty lamps, or a bad ground for the rear fog lamps.

#### Test Description

The number(s) below refer to step(s) on the diagnostic table.

1. The front fog lamps will not turn on unless the parking lamps or headlamps are on.
11. The rear fog lamp relay is located in the relay area under the instrument panel.
13. The rear fog lamp switch is powered through a diode which is taped to the body wiring harness near the instrument panel fuse block. If it is necessary to test power at the diode, remove the driver kick panel.

Step	Action	Value(s)	Yes	No
1	Check the headlamps and the front fog lamps. Do the headlamps and the front fog lamps operate?	-	Go to Step 3	Go to Step 2
2	Repair the headlamps or the front fog lamps before completing this diagnostic table. Do the rear fog lamps work after the headlamps or the front fog lamps have been repaired?	-	System OK	Go to Step 3
3	1. Remove the rear fog lamp bulbs. 2. Turn the headlamps on. 3. Turn the rear fog lamp switch on. 4. Check the voltage at the RED wire to the rear fog lamp bulbs. Is the voltage equal to the specified value?	11-14 v	Go to Step 4	Go to Step 7
4	With the rear fog lamp bulbs removed, use an ohmmeter to check the continuity between the BLK wire at the rear fog lamps and ground. Does the ohmmeter indicate the specified value?	- 0 $\Omega$	Go to Step 6	Go to Step 5
5	Repair the faulty BLK wire between the rear fog lamps and ground. Is the repair complete?	-	System OK	-
6	Replace the faulty fog lamp bulbs. Is the repair complete?	-	System OK	-
7	Check fuses EF1 and F5. Is either fuse blown?	-	Go to Step 8	Go to Step 9
8	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
9	Check the voltage at EF1 and F5. Is the voltage equal to the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the power supply circuit to the fuses. Is the repair complete?	-	System OK	-
11	1. Remove the rear fog lamp relay. 2. Probe the relay socket terminal 30 with a voltmeter. Is the voltage equal to the specified value?	11-14 v	Go to Step 13	Go to Step 12
12	Repair the open circuit between fuse F5 and terminal 30 of the rear fog lamp relay. Is the repair complete?	-	System OK	-

## Rear Fog Lamps Are Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
13	1. With the rear fog lamp relay still disconnected, turn the headlamps on. 2. Probe the rear fog lamp relay socket terminal 15. Is the voltage equal to the specified value?	11-14 v	Go to Step 23	Go to Step 14
14	1. Remove the rear fog lamp switch for testing, but do not disconnect the electrical connector. 2. Turn the headlamps on. 3. Check the voltage at the BRN/WHT wire at the rear fog lamp switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 15	Go to Step 18
15	1. With the rear fog lamp switch removed for testing, turn the headlamps on. 2. Turn the rear fog lamp switch on. 3. Check the voltage at the YEL wire at the rear fog lamp switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 16	Go to Step 17
16	Repair the open circuit between the rear fog lamp switch and the rear fog lamp relay terminal E. Is the repair complete?	-	System OK	-
17	Replace the rear fog lamp switch. Is the repair complete?	-	System OK	-
18	1. Turn the headlamps on. 2. Check the voltage at the LT BLU wire at the rear fog lamp diode. Is the voltage equal to the specified value?	11-14 v	Go to Step 20	Go to Step 19
19	Repair the open circuit between the rear fog lamp diode and the headlamp relay. Is the repair complete?	-	System OK	-
20	1. Turn the headlamps on. 2. Check the voltage at the WHT wire at the rear fog lamp diode. Is the voltage equal to the specified value?	11-14 v	Go to Step 21	Go to Step 22
21	Repair the open circuit between the rear fog lamp diode and the rear fog lamp switch. Is the repair complete?	-	System OK	-
22	Replace the rear fog lamp diode. Is the repair complete?	-	System OK	-
23	1. Temporarily substitute a known good relay in place of the rear fog lamp relay. 2. Turn the headlamps on. 3. Turn the rear fog lamp switch on. Do the rear fog lamps work with the substituted relay?	-	Go to Step 24	Go to Step 25
24	1. Return the substituted relay to its original position. 2. Replace the rear fog lamp relay. Is the repair complete?	-	System OK	-
25	Connect a jumper wire between terminal 30 and terminal R7 at the rear fog lamp relay socket. Do the rear fog lamps turn on?	-	Go to Step 26	Go to Step 27

## Rear Fog Lamps Are Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
26	Repair the ground circuit for the rear fog lamp relay. Is the repair complete?	-	System OK	-
27	Repair the open circuit between the rear fog lamp relay and the rear fog lamps. Is the repair complete?	-	System OK	-

## TAIL/STOP/TURN/BACKUP LAMPS

## Tallamps Do Not Work

**Notice:** When probing a bulb socket with a voltmeter or a test lamp, do not contact the side of the socket (ground); when you are testing the positive contact at the bottom of the socket. If the voltage and the ground are both available at the bulb socket, contacting both at the same time with a test probe will cause a blown fuse.

Step	Action	Value(s)	Yes	No
1	Check the headlamps. Do the headlamps work?	-	Go to Step 3	Go to Step 2
2	Repair the headlamps before continuing with this chart. After the headlamps have been repaired, are the rear combination lamps still inoperative?	-	Go to Step 3	System OK
3	1. Turn the taillamps on. 2. Use a voltmeter to check voltage at the bulb socket positive terminal. Does voltage at the bulb socket equal the specified value?	11-14 v	Go to Step 4	Go to Step 7
4	Connect an ohmmeter between ground and the lamp socket negative terminal. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 8	Go to Step 5
5	Repair the ground circuit for the lamps. Is the repair complete?	-	System OK	-
6	Replace the faulty bulbs. Is the repair complete?	-	System OK	-
7	Check fuses EF34, EF20, and EF21. Is any of the fuses blown?	-	Go to Step 8	Go to Step 9
8	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
9	1. Turn the headlamps on. 2. Check the voltage at fuses EF21 for the left side taillamp and EF20 for the right-side taillamp. Does the voltage at the fuses equal the specified value?	11-14 v	Go to Step 23	Go to Step 10
10	Check the voltage at fuse EF34. Does the voltage at fuse EF34 equal the specified value?	11-14 v	Go to Step 12	Go to Step 11
11	Repair the battery supply circuit to fuse EF34. Is the repair complete?	-	System OK	-
12	1. Temporarily substitute the headlamp relay for the illumination relay. 2. Turn the taillamp switch on. Do the taillamps illuminate?	-	Go to Step 13	Go to Step 14

## Taillamps Do Not Work (Cont'd)

Step	Action	Value(s)	Yes	No
13	1. Return the headlamp relay to its original position. 2. Replace the illumination relay. Is the repair complete?	-	System OK	-
14	1. Remove the taillamp relay. 2. Use a voltmeter to check the illumination relay socket at the connector terminal 85. Is the voltage at the connector terminal 85 of the taillamp relay equal to the specified value?	11-14 v	Go to Step 16	Go to Step 15
15	Repair the open circuit between fuse EF34 and the connector for the illumination relay terminal 85. Is the repair complete?	-	System OK	-
16	Connect an ohmmeter between ground and the illumination relay terminal 86. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 18	Go to Step 17
17	Repair the ground circuit for the illumination relay. Is the repair complete?	-	System OK	-
18	1. Turn the taillamp on. 2. Check the voltage at the connector for terminal 30 of the illumination relay. Is the voltage equal to the specified value?	11-14 v	Go to Step 22	Go to Step 19
19	1. Disconnect the headlamp switch connector C2. 2. On the disconnected switch, turn the taillamps on. 3. At switch C2, use an ohmmeter to check for continuity between terminal 2 and terminal 3. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 21	Go to Step 20
20	Repair the open circuit between the headlamp switch C2 terminal 3 and terminal 86 of the illumination relay. Is the repair complete?	-	System OK	-
21	Replace the headlamp switch. Is the repair complete?	-	System OK	-
22	Repair the open circuit between terminal 87 of the taillamp and fuses EF20 and EF21. Is the repair complete?	-	System OK	-
23	Repair the open circuit between the fuses EF20 and EF21 and the taillamps. Is the repair complete?	-	System OK	-



### Stoplamps Do Not Work

**Notice:** When probing a bulb socket with a voltmeter or a test lamp, do not contact the side of the socket (ground) when you are testing the positive contact at the bottom of the socket. If the voltage and the ground are both available at the bulb socket, contacting both at the same time with a test probe will cause a blown fuse.

Step	Action	Value(s)	Yes	No
1	Check fuse EF23 Is fuse EF23 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	1. Press the brake pedal down. 2. Check the positive terminals of the bulb sockets with a test lamp. Does the test lamp illuminate?	-	Go to Step 4	Go to Step 6
4	Connect an ohmmeter between ground and the stoplamp ground terminal Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 6	Go to Step 5
5	Repair the ground circuit Is the repair complete?	-	System OK	-
6	1. Disconnect the wiring connector from the stoplamp switch 2. Press the brake pedal down. 3. Use an ohmmeter to check continuity between terminals 2 and 1 Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 8	Go to Step 7
7	Replace the stoplamp switch. Is the repair complete?	-	System OK	-
8	1. Disconnect the stoplamp switch electrical connector. 2. Check the voltage at terminal 2. Does the voltmeter show the specified value?	11-14 v	Go to Step 10	Go to Step 9
9	Repair the open circuit between the fuse EF23 and the stoplamp switch. Is the repair complete?	-	System OK	-
10	Repair the open circuit between the stoplamp switch and the stoplamps Is the repair complete?	-	System OK	-

## Backup Lamps Inoperative

Step	Action	Value(s)	Yes	No
1	Check fuse F14. Is fuse F14 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace fuse F14. Is the repair complete?	-	System OK	-
3	Use a voltmeter to verify that battery voltage is available at fuse F14. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply circuit for fuse F14. Is the repair complete?	-	System OK	-
5	1. Remove and examine the backup lamp bulbs. 2. Test the bulbs by connecting them to the vehicle battery with jumper wires. Are the bulbs defective?	-	Go to Step 6	Go to Step 7
6	Replace the defective bulbs. Is the repair complete?	-	System OK	-
7	1. Reinstall the backup lamps after testing. 2. Turn the ignition ON. 3. Disconnect the backup switch connector. 4. Check the voltage at terminal A of the backup switch (or terminal 1 of the neutral safety/backup switch if the vehicle has an automatic transmission). Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 8
8	Repair the open circuit between fuse F14 and the backup switch. Is the repair complete?	-	System OK	-
9	1. Turn the ignition ON. 2. Apply the parking brake. 3. Block the wheels to prevent the vehicle from moving. 4. Put the transaxle in REVERSE. 5. Use a voltmeter to check voltage at terminal B of the backup switch (or terminal 2 of the neutral safety/backup switch if the vehicle has an automatic transmission). Does the voltmeter indicate the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Replace the backup switch. Is the repair complete?	-	System OK	-
11	1. Remove one of the backup lamps. 2. Turn the ignition ON. 3. Apply the parking brake. 4. Block the wheels to prevent the vehicle from moving. 5. Put the transaxle in REVERSE. 6. Use a voltmeter to check voltage at the positive terminal of the backup lamp socket. Does voltage at the lamp socket equal the specified value?	11-14 v	Go to Step 12	Go to Step 13
12	Repair the ground circuit of the backup lamps. Is the repair complete?	-	System OK	-
13	Repair the open circuit between the backup lamps and the backup switch. Is the repair complete?	-	System OK	-

### Turn Signal Lamps and Hazard Lamps Do Not Work

**Notice:** When probing a bulb socket with a voltmeter or a test lamp, do not contact the side of the socket (ground) when you are testing the positive contact at the bottom of the socket. If the voltage and the ground are both available at the bulb socket, contacting both at the same time with a test probe will cause a blown fuse.

Step	Action	Value(s)	Yes	No
1	Check fuses EF12 and F11 Is either fuse blown?	-	Go to Step 2	Go to Step 3
2	Check for a short circuit and repair if necessary Replace the fuse. Is the repair complete?	-	System OK	-
3	1. Turn the ignition on. 2. Check the voltage at fuse FF12 and F11 Does the battery voltage available at both fuses EF12 and F11 equal the specified value?	11-14 v	Go to Step 4	Go to Step 7
4	1. Turn the hazard lamp switch on. 2. Remove each of the inoperative lamps from its socket. 3. Test each lamp socket positive terminal with a voltmeter. Does the battery voltage pulsing at the turn-signal, hazard-lamp socket positive terminal equal the specified value?	11-14 v	Go to Step 5	Go to Step 9
5	At each bulb socket, use an ohmmeter to check the ground circuit. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 6	Go to Step 8
6	Replace any faulty turn signal/hazard bulbs. Is the repair complete?	-	System OK	-
7	Repair the power supply circuit to fuses Is the repair complete?	-	System OK	-
8	Repair the open ground circuit. Is the repair complete?	-	System OK	-
9	1. Turn on the hazard switch. 2. Test the blinker unit connector terminal 49a with a voltmeter. Does the battery voltage pulsing at the blinker unit terminal 49a equal the specified value?	11-14 v	Go to Step 15	Go to Step 10
10	1. Turn on the hazard switch. 2. Test the blinker unit connector terminal 49 with a voltmeter. Does the battery voltage available at the blinker unit terminal 49 equal the specified value?	11-14 v	Go to Step 11	Go to Step 14
11	1. Disconnect the blinker unit from the connector. 2. Use an ohmmeter to check between ground and the connector for terminal 31 of the blinker unit. Is the resistance equal to the specified value?	0-0.5 $\Omega$	Go to Step 13	Go to Step 12
12	Repair the blinker unit ground connection Is the repair complete?	-	System OK	-
13	Replace faulty blinker unit. Is the repair complete?	-	System OK	-

## Turn Signal Lamps and Hazard Lamps Do Not Work (Cont'd)

Step	Action	Value(s)	Yes	No
14	1. Disconnect the hazard switch connector. 2. Check for voltage at terminal 8. 3. Turn the ignition on. 4. Check for voltage at terminal 10. Does the battery voltage available at both terminals equal the specified value?	11-14 v	Go to Step 15	Go to Step 19
15	1. Remove the hazard switch. 2. Turn the hazard switch OFF. 3. Check for continuity between terminals 7 and 10. 4. Turn the hazard switch on. 5. Check for continuity between terminals 7 and 8. Do both tests show the specified value?	0 $\Omega$	Go to Step 18	Go to Step 16
16	1. Remove the hazard switch. 2. Turn the hazard switch to the on position. 3. Use an ohmmeter to check for continuity between terminals 5, 6, and 9. Does the continuity between terminals 5, 6, and 9 equal the specified value?	0 $\Omega$	System OK	Go to Step 17
17	Replace the faulty hazard switch. Is the repair complete?	-	System OK	-
18	Repair the open circuit between hazard switch terminal 7 and blinker unit terminal 49. Is the repair complete?	-	System OK	-
19	Repair the open circuit between the hazard switch and the fuses EF12 or F11. Is the repair complete?	-	System OK	-

## Hazard Lamps Do Not Operate, Turn Signals Are OK

Step	Action	Value(s)	Yes	No
1	Check fuse EF12. Is fuse EF12 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	Use a voltmeter to check for power to fuse EF12. Does the battery voltage available at fuse EF12 equal the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply circuit to fuse EF12. Is the repair complete?	-	System OK	-
5	1. Disconnect the hazard switch connector. 2. Use a voltmeter to check power to the hazard switch terminal 8. Does the battery voltage available at connector terminal 8 equal the value specified?	11-14 v	Go to Step 6	Go to Step 9
6	1. Remove the hazard switch and disconnect it for testing. 2. Turn the hazard switch to the on position. 3. Test with an ohmmeter between terminals 8 and 7. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 7	Go to Step 10
7	1. With the hazard switch still removed and disconnected for testing, turn the hazard switch to the on position. 2. Use an ohmmeter to check between terminals 5, 6, and 9. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 8	Go to Step 10
8	Repair the open circuit between the hazard switch connector and splice S303. Is the repair complete?	-	System OK	-
9	Repair the open circuit between the hazard switch connector terminal 8 and fuse EF12. Is the repair complete?	-	System OK	-
10	Replace the faulty hazard switch. Is the repair complete?	-	System OK	-

## INTERIOR COURTESY AND LUGGAGE COMPARTMENT LAMPS

### Interior Courtesy Lamp Inoperative

**Caution:** Always make sure there is an electrical load such as a lamp bulb, etc. in any circuit between battery terminals. Do not make a short circuit between battery terminals with a jumper wire, or hazardous sparking will result.

#### Test Description

The number(s) below refers to step(s) on the diagnostic table.

1. Bulb test. Clip one end of a jumper wire to the negative battery terminal. Clip the other end of the jumper wire onto one end of the bulb. Take the end of the bulb without the jumper attached and touch it to the positive battery terminal.

Step	Action	Value(s)	Yes	No
1	1. Remove the interior courtesy lamp bulb and inspect the filament. 2. If the filament is not broken, test the bulb using the vehicle's battery and a jumper wire. Does the bulb pass the visual and physical checks?	-	Go to Step 3	Go to Step 2
2	Replace the bulb. Is the repair complete?	-	System OK	-
3	1. Reinstall the interior courtesy lamp bulb. 2. Check fuses EF7 and EF32. Is either fuse EF7 or EF32 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit and repair it if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
5	Check the voltage at fuses EF7 and EF32. Does the voltage at fuses EF7 and EF32 equal the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the battery and fuses EF7 and EF32. Is the repair complete?	-	System OK	-
7	1. Disconnect the interior courtesy lamp electrical connector. 2. Check the voltage at connector terminal 3. Does the voltage at connector terminal 3 equal the value specified?	11-14 v	Go to Step 8	Go to Step 9
8	Repair the open circuit between fuse EF32 and the interior courtesy lamp terminal 3. Is the repair complete?	-	System OK	-
9	Use an ohmmeter to check the resistance between ground and terminal 4 of the interior courtesy lamp connector on the harness side. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 10	Go to Step 11
10	Replace the interior courtesy lamp switch assembly. Is the repair complete?	-	System OK	-
11	Repair the ground circuit for the interior courtesy lamp. Is the repair complete?	-	System OK	-

### Luggage Compartment Lamp Inoperative

**Caution:** Always make sure there is an electrical load such as a lamp bulb, etc. in any circuit between battery terminals. Do not make a short circuit between battery terminals with a jumper wire, or hazardous sparking will result.

The number(s) below refer to step(s) on the diagnostic table.

1. Bulb test: Clip one end of a jumper wire to the negative battery terminal. Clip the other end of the jumper wire onto one end of the bulb. Take the end of the bulb without the jumper attached and touch it to the positive battery terminal.

Step	Action	Value(s)	Yes	No
1	1. Remove the luggage compartment lamp bulb and inspect the filament. 2. If the filament is not broken, test the bulb using the vehicle's battery and a jumper wire. Does the bulb pass the visual and physical check?	-	Go to Step 3	Go to Step 2
2	Replace the bulb. Is the repair complete?	-	System OK	-
3	1. Reinstall the luggage compartment lamp bulb. 2. Check fuse EF29. Is fuse EF29 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
5	Check the voltage at fuse EF29. Does the voltage at fuse EF29 equal the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the battery and fuse EF29. Is the repair complete?	-	System OK	-
7	1. Disconnect the luggage compartment lamp electrical connector. 2. Check the voltage at the ORN wire. Does the voltage at the ORN wire equal the specified value?	11-14 v	Go to Step 8	Go to Step 9
8	Repair the open circuit between fuse EF29 and the luggage compartment lamp. Is the repair complete?	-	System OK	-
9	1. Reconnect the luggage compartment lamp. 2. Remove the luggage compartment lamp switch. 3. With a voltmeter or test lamp, test the PINK/BLK wire at the luggage compartment lamp switch. Does the voltage at the luggage compartment lamp switch equal the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the open circuit between the luggage compartment lamp and the luggage compartment lamp switch. Is the repair complete?	-	System OK	-
11	Use an ohmmeter to check the resistance between ground and the luggage compartment lamp switch. Is the resistance equal to the specified value?	0 Ω	Go to Step 12	Go to Step 13
12	Replace the luggage compartment lamp switch. Is the repair complete?	-	System OK	-
13	Repair the ground circuit for the luggage compartment lamp switch. Is the repair complete?	-	System OK	-

### Ignition Key Illumination Lamp Is Inoperative

#### Diagnostic Aids

In a vehicle equipped with a sunroof, the interior courtesy lamp is located near the rearview mirror and also serves as a map lamp. In a non-sunroof vehicle, the interior courtesy lamp is in the roof in the middle of the passenger compartment, and there are separate map lamps near the rearview mirror.

There is a timer in the interior courtesy lamp that will only supply a ground to the key illumination lamp for a few seconds after a door is opened and closed.

#### Test Description

The number(s) below refer to step(s) on the diagnostic table.

5. The resistance of the key illumination bulb and attached harness is approximately 14.1 ohms.

Step	Action	Value(s)	Yes	No
1	1. Set the switch on the courtesy lamp so that it comes on when a door is opened. 2. Check the function of the courtesy lamp. Is the courtesy lamp operating?	-	Go to Step 3	Go to Step 2
2	Repair the interior courtesy lamp system before completing this diagnostic table. Does the key illumination lamp function after the courtesy lamp has been repaired?	-	System OK	Go to Step 3
3	1. Remove the lower steering column cover to gain access to the connectors for the ignition switch. 2. Disconnect the connector to the key illumination lamp. 3. Check the voltage at terminal 1 of the key illumination lamp connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open circuit between fuse F-29 and the ignition key illumination lamp connector. Is the repair complete?	-	System OK	-
5	1. Remove the key illumination lamp and the attached wires and connector. 2. Use a vehicle battery and jumper wires to directly power the illumination lamp through its attached connector and wires. Does the key illumination lamp turn on when it is directly connected to power and ground from a battery?	-	Go to Step 9	Go to Step 6
6	Check the key illumination lamp bulb. Is the bulb defective?	-	Go to Step 7	Go to Step 8
7	Replace the key illumination lamp bulb. Is the repair complete?	-	System OK	-
8	Replace the lamp socket and the attached wires and connector. Is the repair complete?	-	System OK	-



## Ignition Key Illumination Lamp Is Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
9	1. Remove the courtesy lamp. 2. Disconnect the electrical connector of the courtesy lamp. 3. Connect an ohmmeter between key illumination connector terminal 2 and the interior courtesy lamp connector terminal 5. Does the ohmmeter indicate the specified value?	- 0 $\Omega$	Go to Step 11	Go to Step 10
10	Repair the open circuit between the key illumination connector and the courtesy lamp connector. Is the repair complete?	-	System OK	-
11	Replace the courtesy lamp. Is the repair complete?	-	System OK	-

## Vanity Mirror Lighting Is Inoperative

## Diagnostic Aids

If the vanity lighting is working on one side of a mirror but not on the other side, check the lamp bulb. If the vanity mirror lighting is working on one side of the car but not on the other side, begin the diagnostic table at Step 3.

## Test Description

The number(s) below refer to step(s) on the diagnostic table.

1. In a vehicle equipped with a sunroof, the interior courtesy lamp is located near the rearview mirror and also

serves as a map lamp. In a non-sunroof vehicle, the interior courtesy lamp is in the roof in the middle of the passenger compartment, and there are separate map lamps near the rearview mirror. The vanity mirror lamps have the same fuse and ground as the courtesy lamp.

7. The resistance of a vanity mirror lamp bulb is about 4.2 ohms.

Step	Action	Value(s)	Yes	No
1	Check the operation of the courtesy lamp. Does the courtesy lamp operate?	-	Go to Step 3	Go to Step 2
2	Repair the interior courtesy lamp system before completing this diagnostic table. Does the key illumination lamp function after the courtesy lamp system has been repaired?	-	System OK	Go to Step 3
3	1. Remove the sun visor. 2. Check the voltage at terminal 1 of the wire harness connector for the vanity mirror. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open circuit between fuse EF29 and terminal 1 of the vanity mirror connector. Is the repair complete?	-	System OK	-
5	Connect an ohmmeter between ground and terminal 2 of the vanity mirror connector. Does the ohmmeter indicate the specified value?	- 0 $\Omega$	Go to Step 7	Go to Step 6
6	Repair the open circuit between terminal 2 of the vanity mirror connector and ground. Is the repair complete?	-	System OK	-
7	Check the lamp bulb(s). Are the lamp bulbs OK?	-	Go to Step 9	Go to Step 8
8	Replace the faulty lamp bulbs. Is the repair complete?	-	System OK	-
9	Replace the sun visor. Is the repair complete?	-	System OK	-

## DOOR STEP LAMPS

## Door Step Lamps Inoperative

**Caution:** Always make sure there is an electrical load such as a lamp bulb, etc. in any circuit between battery terminals. Do not make a short circuit between battery terminals with a jumper wire, or hazardous sparking will result.

1. Bulb test. Clip one end of a jumper wire to the negative battery terminal. Clip the other end of the jumper wire onto one end of the bulb. Take the end of the bulb without the jumper attached and touch it to the positive battery terminal.

## Test Description

The number(s) below refer to step(s) on the diagnostic table.

Step	Action	Value(s)	Yes	No
1	1. Remove the door step lamp bulb and inspect the filament. 2. If the filament is not broken, test the bulb using the vehicle's battery and a jumper wire. Does the bulb pass the visual and physical check?	-	Go to Step 3	Go to Step 2
2	Replace the bulb. Is the repair complete?	-	System OK	-
3	1. Reinstall the door step lamp bulb. 2. Check fuse EF29. Is fuse EF29 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
5	Check the voltage at fuse EF29. Does the voltage at fuse EF29 equal the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the battery and fuse EF29. Is the repair complete?	-	System OK	-
7	1. Disconnect the door step lamp electrical connector. 2. Check the voltage at terminal 20 of connectors C351 and C361. Does the voltage at terminal 20 of connectors C351 and C361 equal the specified value?	11-14 v	Go to Step 8	Go to Step 9
8	Repair the open circuit between fuse EF29 and the door step lamp. Is the repair complete?	-	System OK	-
9	1. Reconnect the door step lamp. 2. Remove the front door switch. 3. With a voltmeter or test lamp, test the WHT wire at the front door switch. Does the voltage at the front door switch equal the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the open circuit between the door step lamp and the front door switch. Is the repair complete?	-	System OK	-

## Door Step Lamp Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
11	Use an ohmmeter to check the resistance between ground and the BLK wire at the front door switch connector on the harness side. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 12	Go to Step 13
12	Replace the front door switch. Is the repair complete?	-	System OK	-
13	Repair the ground circuit for the front door switch. Is the repair complete?	-	System OK	-

## GLOVE BOX LAMP

## Glove Box Lamp Inoperative

**Caution:** Always make sure there is an electrical load such as a lamp bulb, etc. in any circuit between battery terminals. Do not make a short circuit between battery terminals with a jumper wire, or hazardous sparking will result.

## Test Description

The number(s) below refer to step(s) on the diagnostic table.

1. Bulb test. Clip one end of a jumper wire to the negative battery terminal. Clip the other end of the jumper wire onto one end of the bulb. Take the end of the bulb without the jumper attached and touch it to the positive battery terminal.

Step	Action	Value(s)	Yes	No
1	1. Remove the glove box lamp bulb and inspect the filament. 2. If the filament is not broken, test the bulb using the vehicle's battery and a jumper wire. Does the bulb pass the visual and physical check?	-	Go to Step 3	Go to Step 2
2	Replace the bulb. Is the repair complete?	-	System OK	-
3	1. Reinstall the glove box lamp bulb 2. Check fuse F8. Is fuse F8 blown?	-	Go to Step 4	Go to Step 5
4	1. Check for a short circuit and repair if necessary 2. Replace the fuse. Is the repair complete?	-	System OK	-
5	Check the voltage at fuse F8. Does the voltage at fuse F8 equal the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the battery and fuse F8. Is the repair complete?	-	System OK	-
7	1. Disconnect the glove box lamp electrical connector. 2. Check the voltage at terminal 1 of the glove box lamp. Does the voltage at terminal 1 of the glove box lamp equal the specified value?	11-14 v	Go to Step 8	Go to Step 9
8	Repair the open circuit between fuse F8 and the glove box lamp. Is the repair complete?	-	System OK	-

## Glove Box Lamp Inoperative (Cont'd)

Step	Action	Value(s)	Yes	No
9	1. Connect the glove box lamp. 2. Remove the glove box lamp switch. 3. With a voltmeter or test lamp, test terminal 1 of the glove box lamp switch at the glove box switch. Does the voltage at terminal 1 of the glove box lamp switch equal the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the open circuit between the glove box lamp and the glove box lamp switch. Is the repair complete?	-	System OK	-
11	Use an ohmmeter to check the resistance between ground and terminal 2 of the glove box lamp switch connector on the harness side. Is the resistance equal to the specified value?	0 $\Omega$	Go to Step 12	Go to Step 13
12	Replace the glove box lamp switch. Is the repair complete?	-	System OK	-
13	Repair the ground circuit for the glove box lamp switch. Is the repair complete?	-	System OK	-

## ASHTRAY LAMP

**Notice:** When probing a bulb socket with a voltmeter or a test lamp, do not allow the probe to touch both the positive and the negative contacts at the same time, which will blow a fuse.

Step	Action	Value(s)	Yes	No
1	Check fuses EF34 and EF20. Is either fuse EF34 or EF20 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit to EF34 and EF20 and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	1. Turn the light switch on. 2. Remove the ashtray lamp from the socket. 3. Use a voltmeter, to check battery voltage available at the ashtray lamp socket. Does the battery voltage match the value specified?	-	Go to Step 5	Go to Step 4
4	Repair the open circuit between the ashtray lamp socket and fuse EF20. Is the repair complete?	-	System OK	-
5	1. Turn the light switch on. 2. Using an ohmmeter, check the ground circuit to the lamp socket. Does the resistance equal the value specified?	$\approx 0 \Omega$	Go to Step 7	Go to Step 6
6	Repair the open ground circuit between the ashtray lamp socket and ground. Is the repair complete?	-	System OK	-
7	Replace the ashtray lamp. Is the repair complete?	-	System OK	-

**CIGAR LIGHTER****Cigar Lighter Inoperative**

Step	Action	Value(s)	Yes	No
1	Check fuse F8. Is the fuse blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	1. Turn the ignition key to the ACC position. 2. Use a voltmeter to check for voltage at fuse F8. Does the battery voltage available at the fuse F8 match the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power-supply circuit for fuse F8. Is the repair complete?	-	System OK	-
5	1. Remove the electrical connector from the back of the cigar lighter. 2. Turn the ignition key to the ACC position. 3. Use a voltmeter to check the voltage at terminal 1 of the cigar lighter. Does the battery voltage available at terminal 1 of the cigar lighter match the value specified?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the fuse F8 and the cigar lighter. Is the repair complete?	-	System OK	-
7	With the ignition key still in the ACC position, use an ohmmeter to check continuity between terminal 2 of the cigar lighter connector and ground. Does the battery voltage match the value specified?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open ground circuit. Is the repair complete?	-	System OK	-
9	Replace the cigar lighter. Is the repair complete?	-	System OK	-

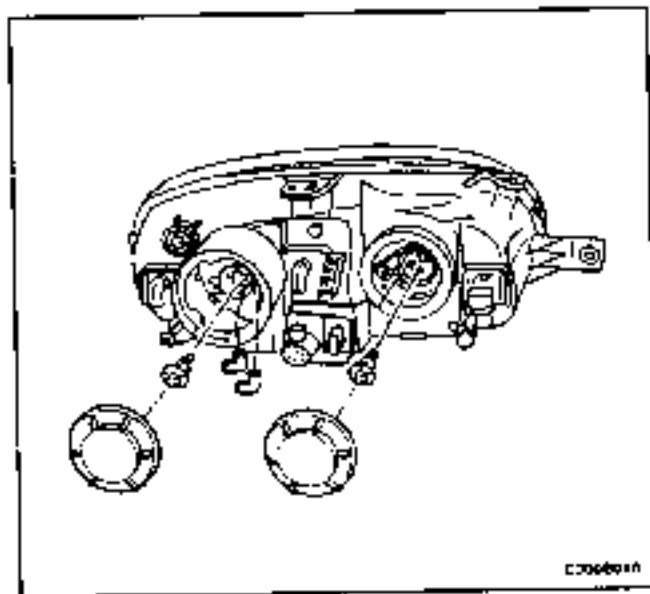
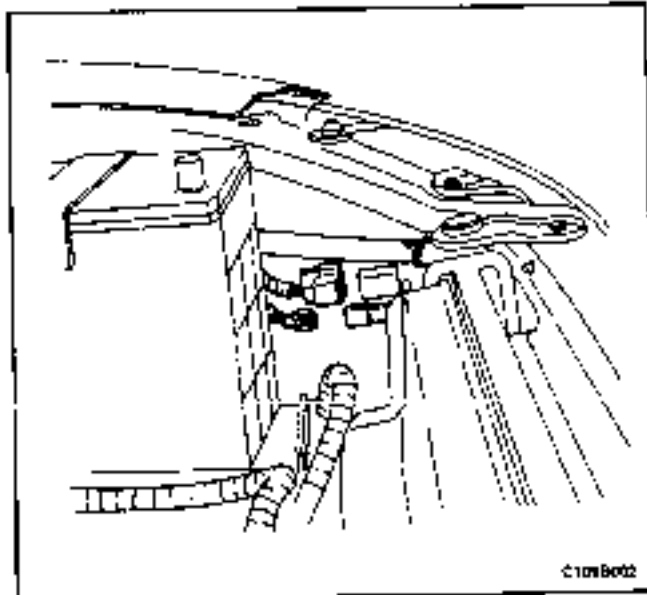
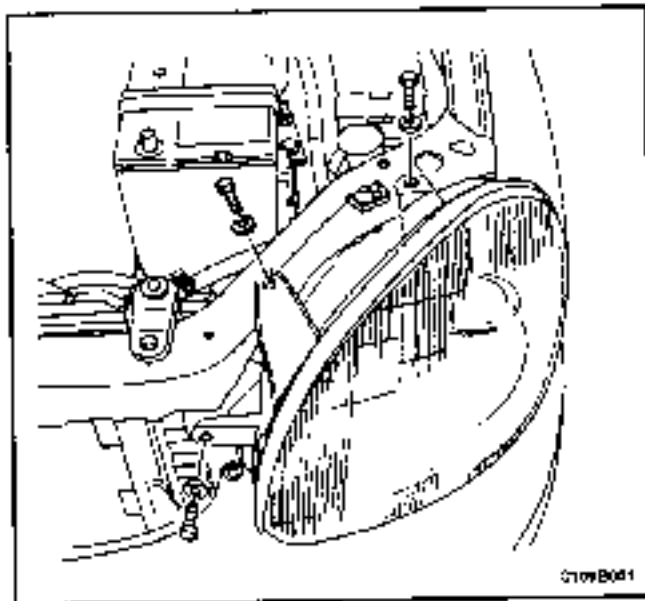
## MAINTENANCE AND REPAIR

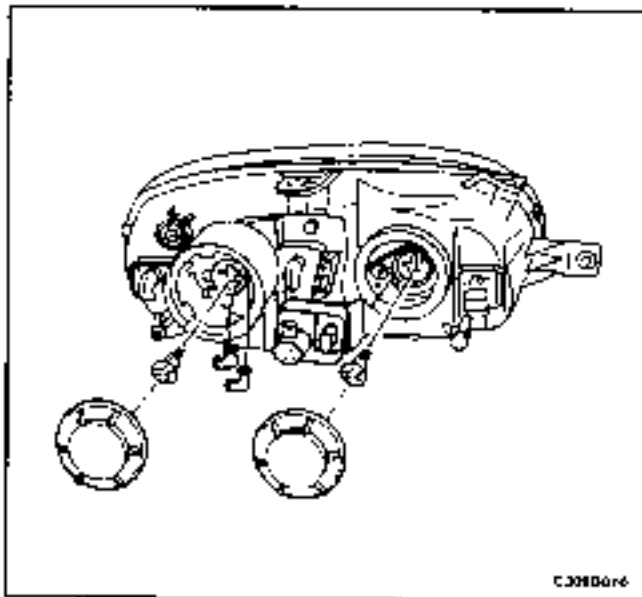
### ON-VEHICLE SERVICE

#### HEADLAMPS

##### Removal Procedure

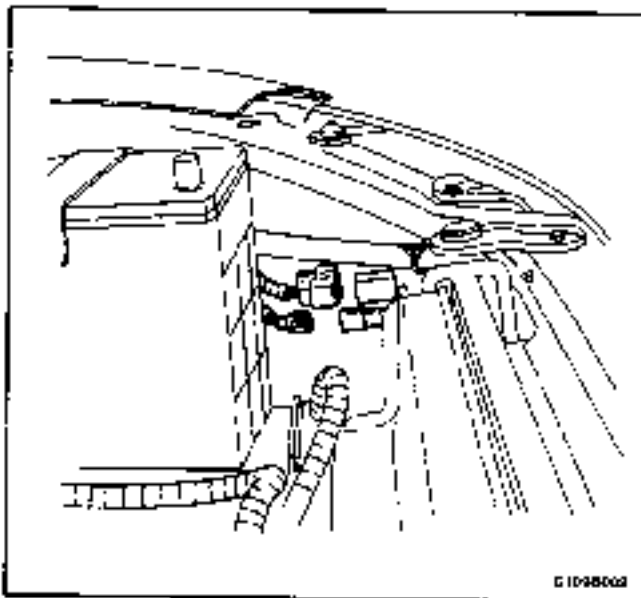
1. Disconnect the negative battery cable.
2. Remove the bolts and the headlamp assembly.
3. Disconnect the headlamp assembly electrical connectors.
4. Remove the cap that conceals the headlamp bulb.
5. Disconnect the headlamp bulb electrical connector.
6. Remove the headlamp bulb.



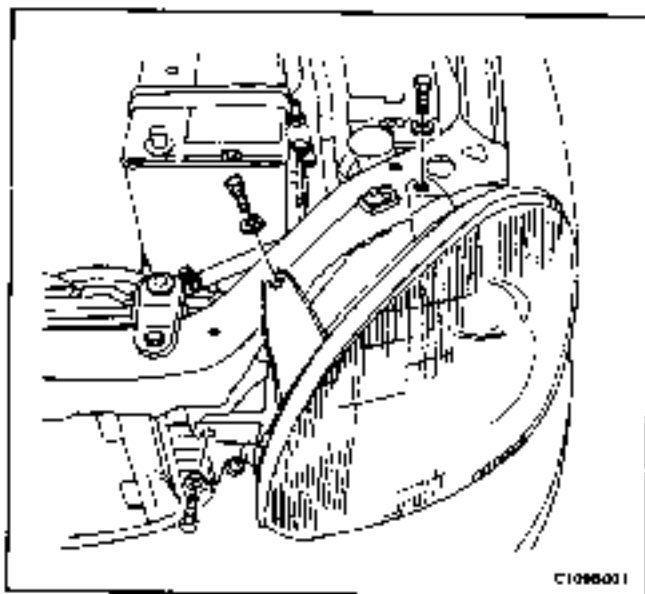


### Installation Procedure

1. Install the replacement headlamp bulb.
2. Connect the headlamp bulb electrical connector.
3. Install the cap that conceals the headlamp bulb.



4. Connect the headlamp assembly electrical connectors.



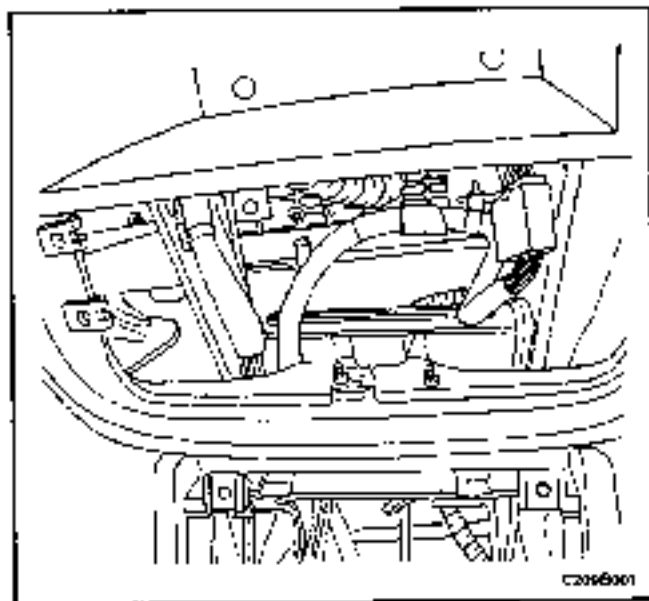
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

5. Install the headlamp assembly with the bolts.

### Tighten

Tighten the headlamp assembly bolts to 4 N·m (35 lb-in).

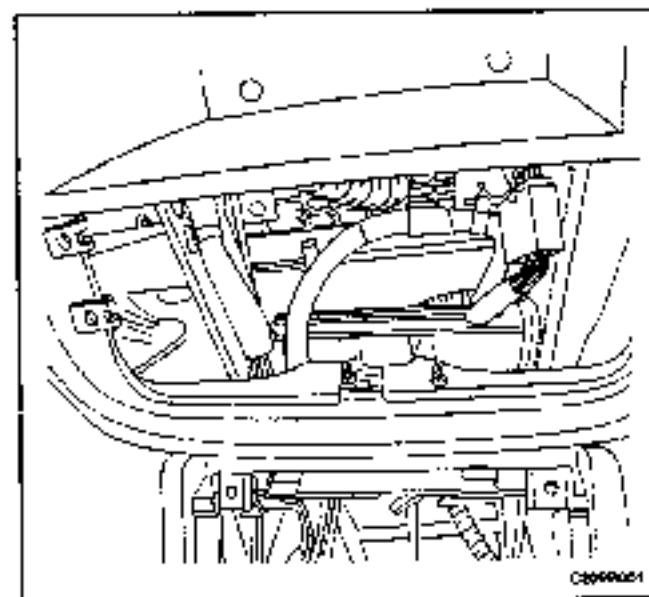
6. Connect the negative battery cable.



## DAYTIME RUNNING LAMP MODULE

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the HVAC controls. Refer to Section 7A, Heating and Ventilation System.
3. Remove the ashtray. Refer to Section 9E, Instrumentation/Driver Information.
4. Remove the screws and the daytime running lamp module.
5. Disconnect the electrical connector.



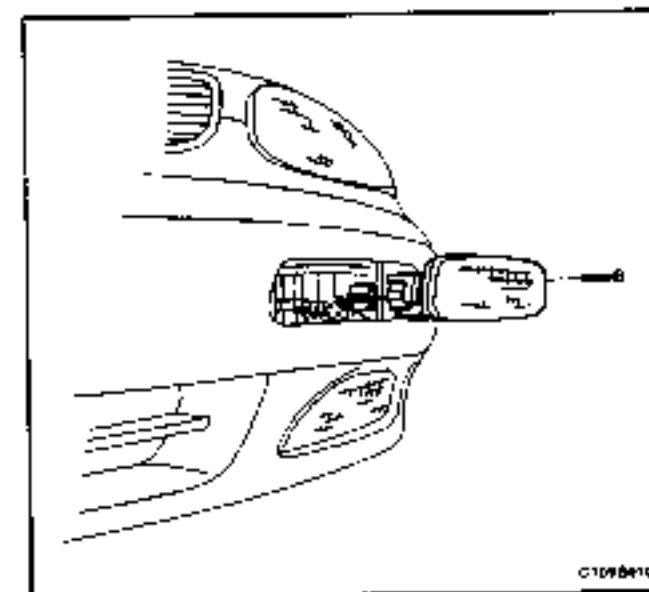
### Installation Procedure

1. Connect the electrical connector.
2. Install the daytime running lamp module with the screws.

#### Tighten

Tighten the daytime running lamp module screws to 4 N·m (35 in·lb).

3. Install the ashtray. Refer to Section 9E, Instrumentation/Driver Information.
4. Install the HVAC controls. Refer to Section 7A, Heating and Ventilation System.
5. Connect the negative battery cable.

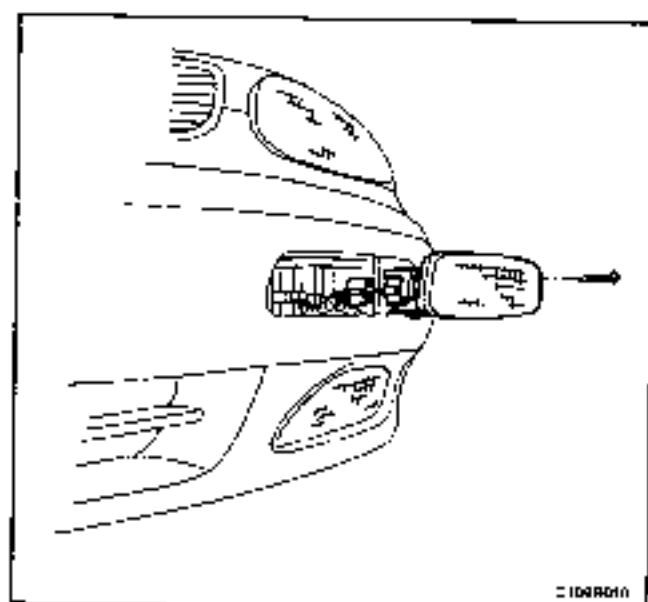


## PARKING AND FRONT TURN SIGNAL LAMPS

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the screw and the front turn signal lamp.
3. Disconnect the electrical connector.
4. Twist and remove the bulb from the front turn signal lamp.





### Installation Procedure

1. Insert and twist to install the replacement bulb into the front turn signal lamp.
2. Connect the electrical connector.

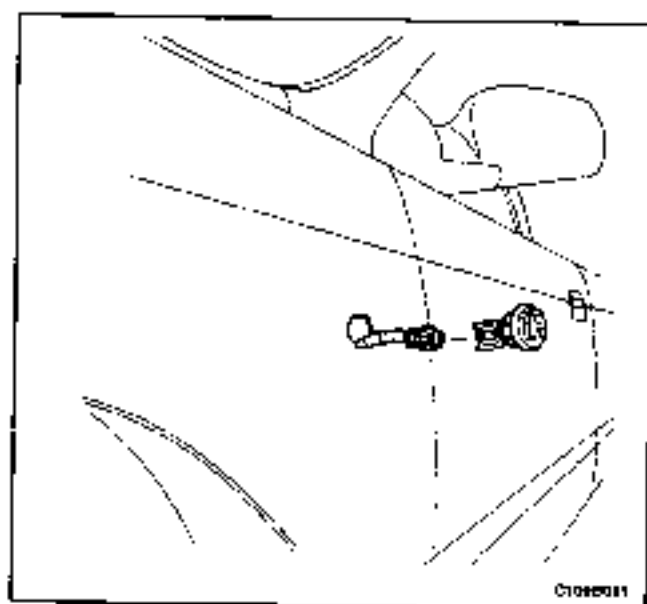
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the front turn signal lamp with the screw.

### Tighten

Tighten the front turn signal lamp screw to 2 N·m (19 lb·in).

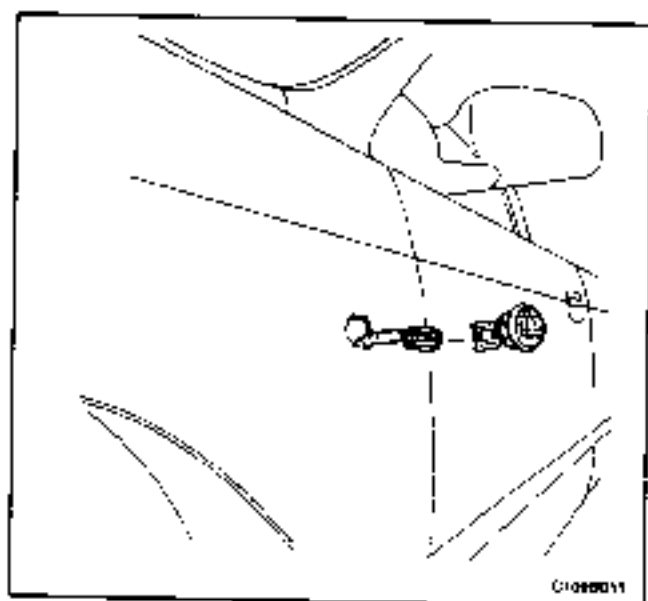
4. Connect the negative battery cable.



### SIDE TURN SIGNAL LAMPS

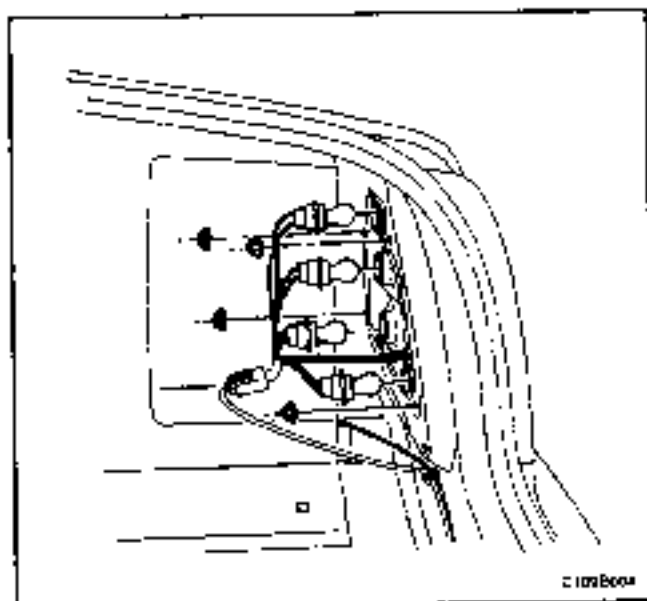
#### Removal Procedure

1. Disconnect the negative battery cable.
2. Slide the side turn signal lamp to the left.
3. Remove the side turn signal lamp from the fender.
4. Disconnect the electrical connector.
5. Twist and remove the bulb from the side turn signal lamp.



#### Installation Procedure

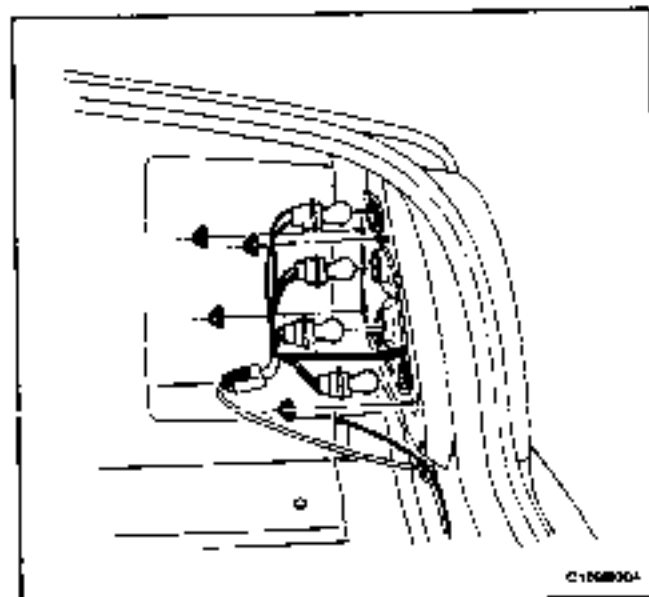
1. Insert and twist to install the replacement bulb into the side turn signal lamp.
2. Connect the electrical connector.
3. Install the side turn signal lamp into the fender.
4. Connect the negative battery cable.



## REAR COMBINATION LAMPS

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the rear luggage compartment trim panel.
3. Disconnect the electrical connectors.
4. Remove the nuts and the lamp assembly.
5. Remove any inoperative bulb.



### Installation Procedure

1. Install the replacement bulbs.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the lamp assembly with the nuts.

#### Tighten

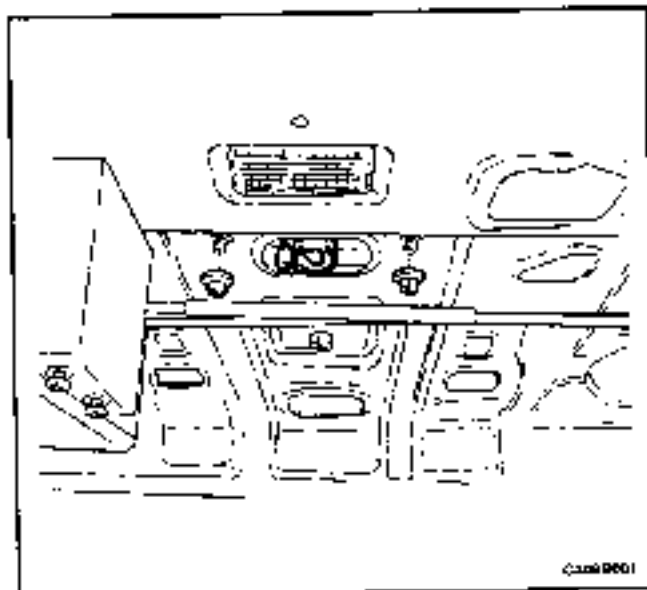
Tighten the rear combination lamp assembly nuts to 2 N•m (18 lb-in).

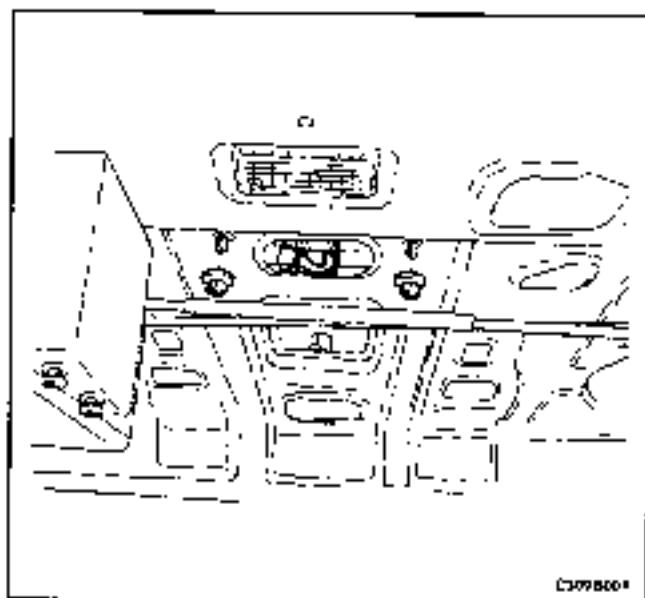
3. Connect the electrical connectors.
4. Install the rear luggage compartment trim panel.
5. Connect the negative battery cable.

## CENTER HIGH-MOUNTED STOPLAMP

### Removal Procedure

1. Disconnect the negative battery cable.
2. Open the rear deck lid.
3. Remove the nuts and the center high-mounted stoplamp (CHMSL).
4. Disconnect the electrical connector.
5. Remove the CHMSL bulb.





### Installation Procedure

1. Install a replacement CHMSL bulb.
2. Connect the electrical connector.

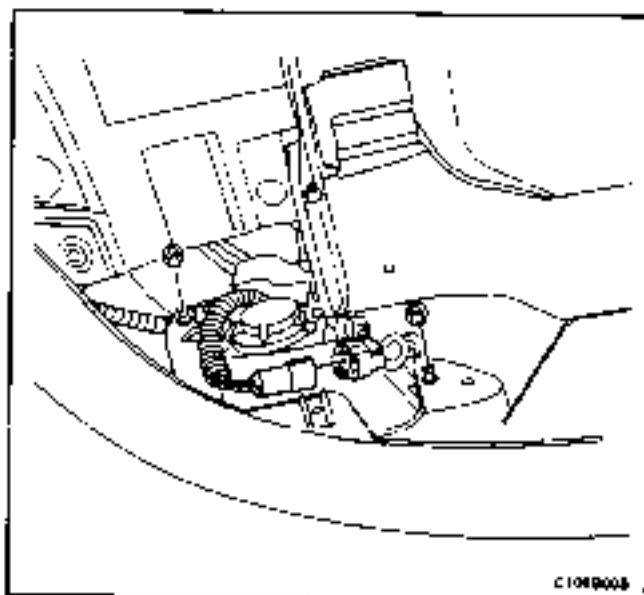
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the CHMSL with the nuts.

### Tighten

Tighten the center high-mounted stoplamp nuts to 4 N·m (35 lb-in).

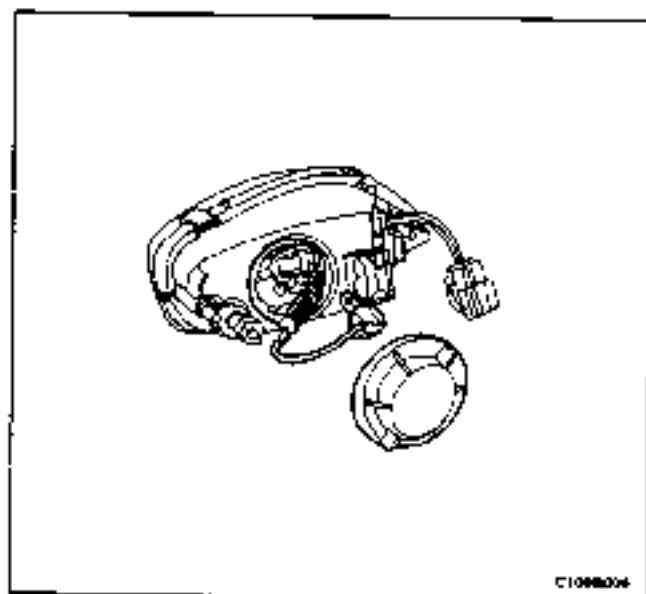
4. Connect the negative battery cable.



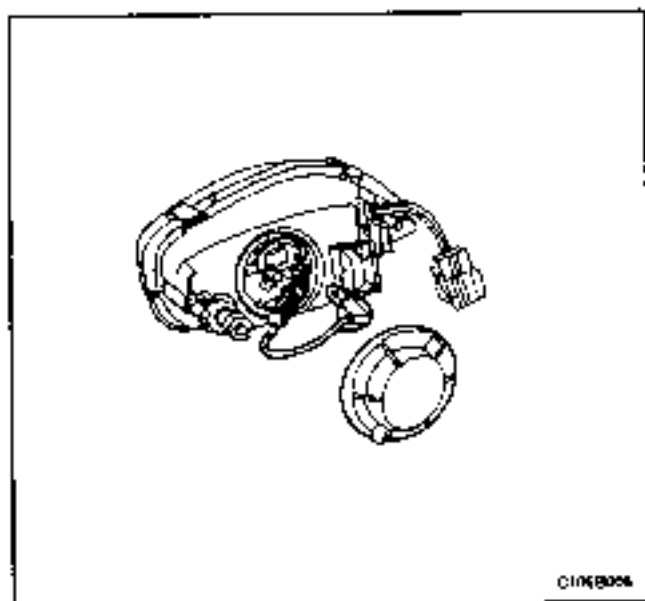
### FRONT FOG LAMPS

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the nuts that secure the fog lamp assembly.
3. Remove the fog lamp assembly.
4. Disconnect the fog lamp assembly electrical connector.

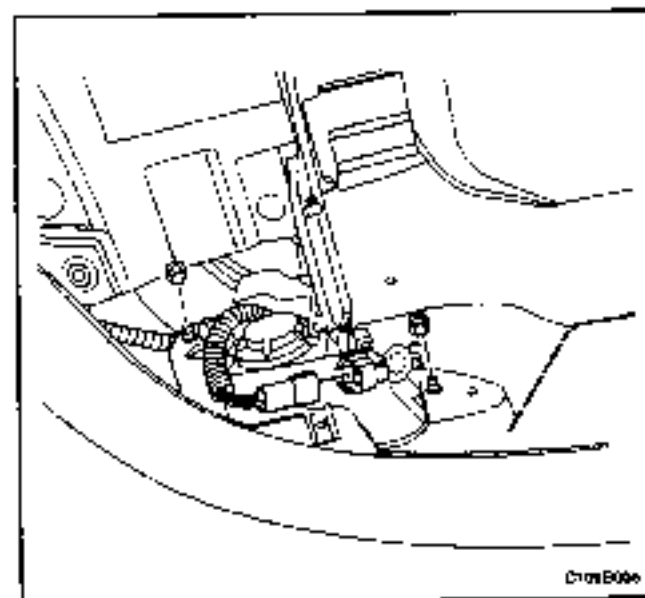


5. Remove the fog lamp access cover.
6. Remove the retaining wire.
7. Remove the bulb from the fog lamp assembly.
8. Disconnect the bulb electrical connector.



### Installation Procedure

1. Connect the bulb electrical connector.
2. Install the replacement bulb into the fog lamp assembly.
3. Install the retaining wire.
4. Install the fog lamp access cover.



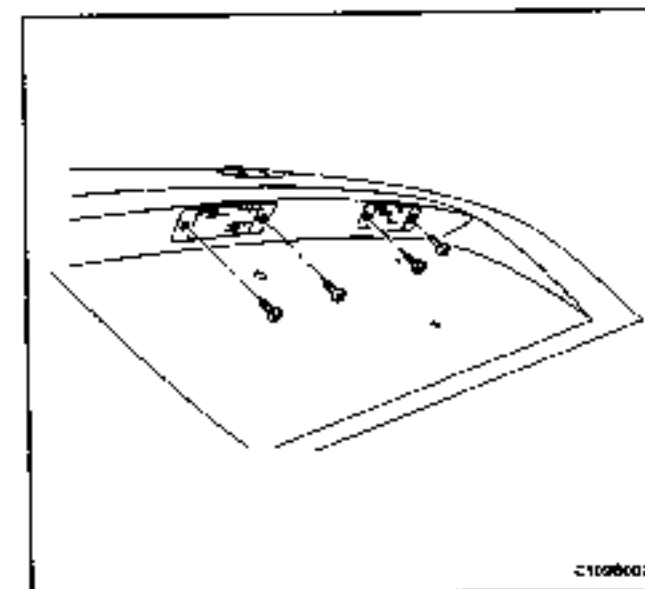
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

5. Install the fog lamp assembly with the nuts.
6. Connect the fog lamp assembly electrical connector.

### Tighten

Tighten the front fog lamp assembly nuts to 4 N•m (36 lb-in).

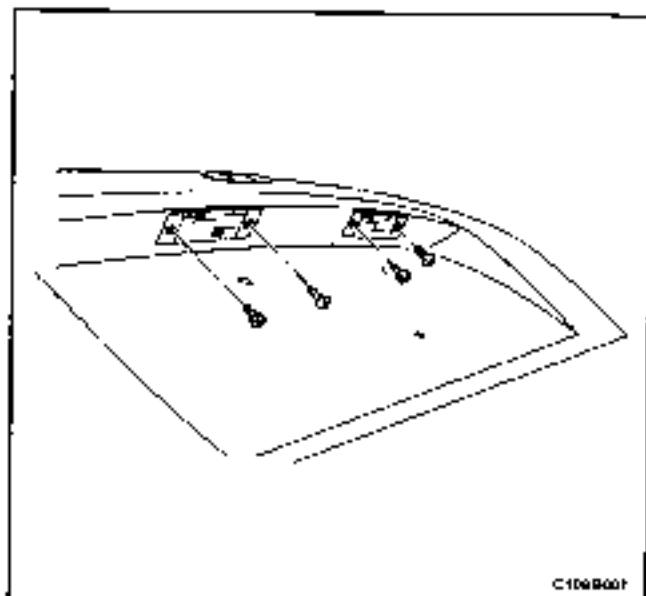
7. Connect the negative battery cable.



## LICENSE PLATE LAMPS

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the screws and the license plate lamp assembly.
3. Remove the bulb.



C1068001

### Installation Procedure

1. Install a replacement bulb.

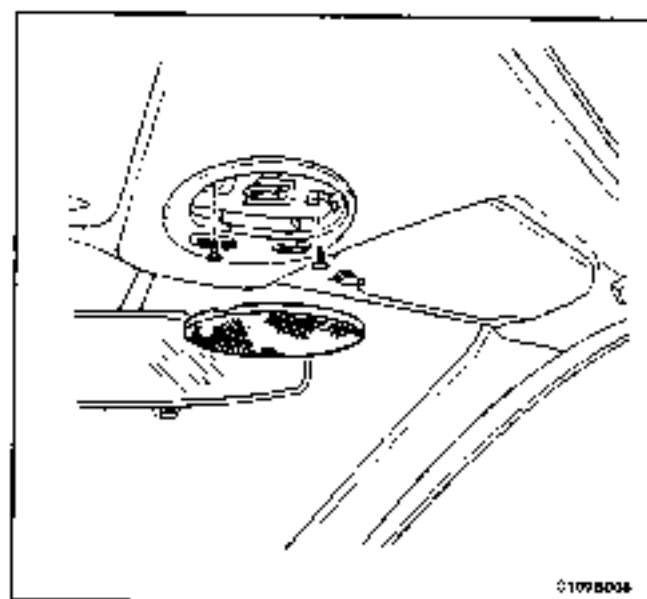
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the license plate lamp assembly with the screws.

### Tighten

Tighten the license plate lamp assembly screws to 2 N·m (16 lb-in)

3. Connect the negative battery cable.

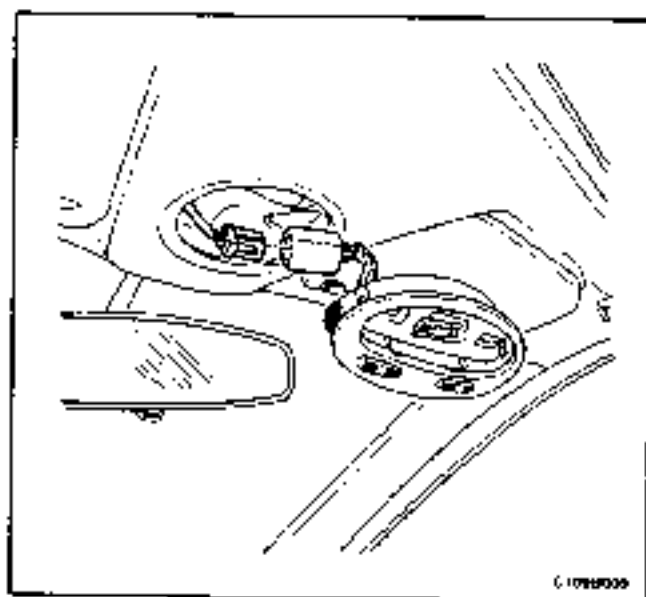


C1075004

## INTERIOR COURTESY LAMP

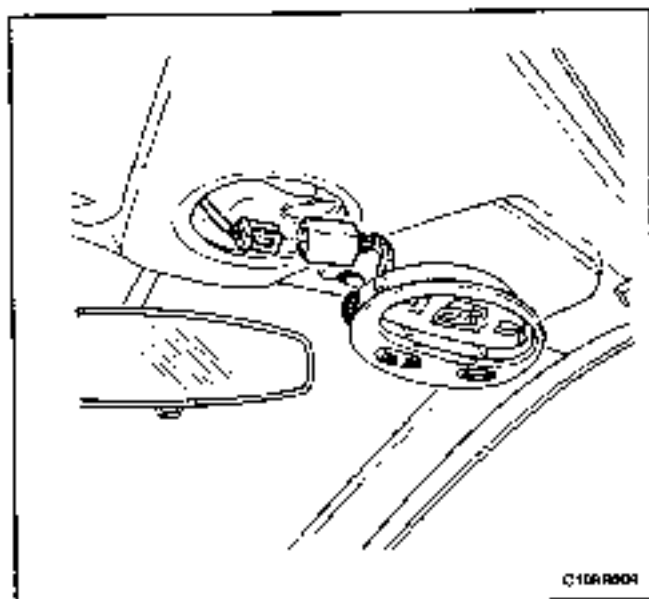
### Removal Procedure

1. Disconnect the negative battery cable.
2. Pry off the courtesy lamp lens by inserting a screwdriver into the recess along the edge of the lens.
3. Remove the screws and the courtesy lamp housing from the headliner.



C1068002

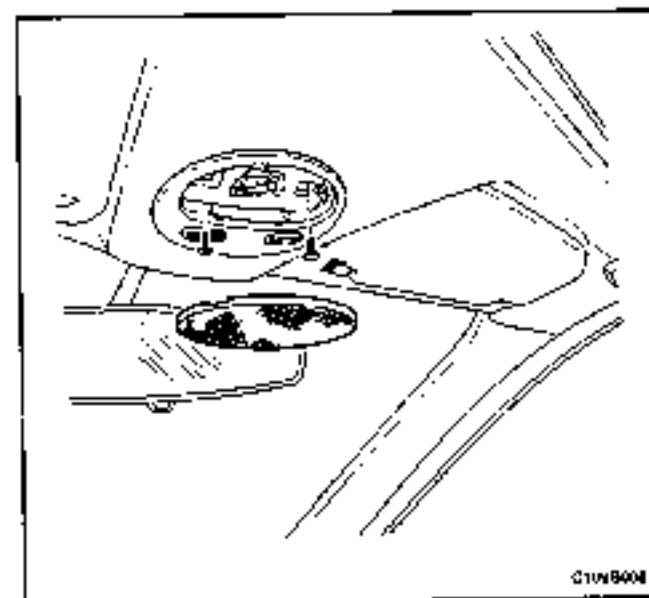
4. Disconnect the electrical connector.
5. Remove the bulb.



C10A9004

### Installation Procedure

1. Install a replacement bulb.
2. Connect the electrical connector.



C11W9004

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the interior courtesy lamp housing to the headliner with the screws.

### Tighten

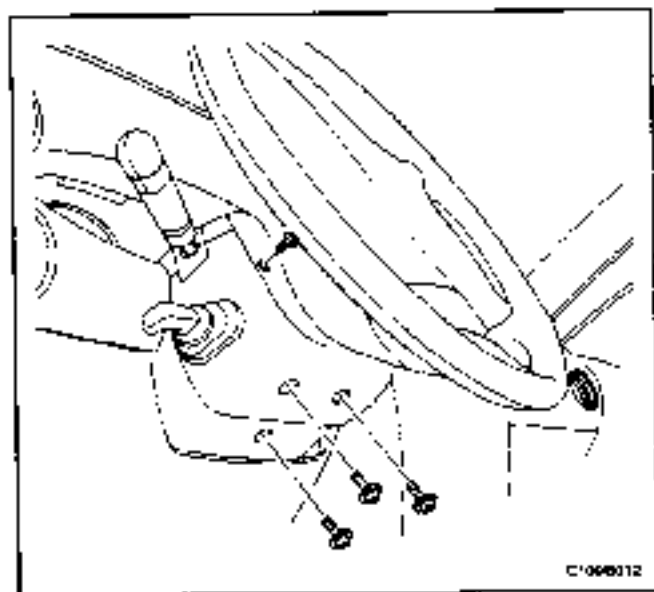
Tighten the interior courtesy lamp housing screw to 2 N·m (18 lb-in).

4. Press the interior courtesy lamp lens onto the housing.
5. Connect the negative battery cable.

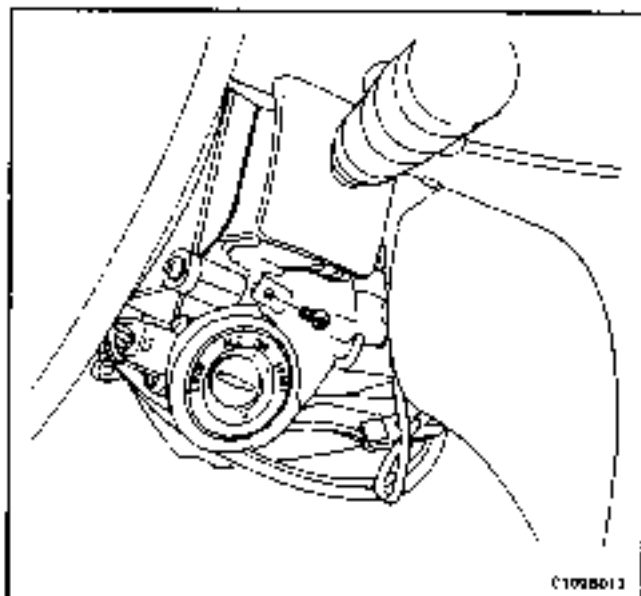
### IGNITION SWITCH KEYHOLE LAMP (Left-Hand Drive Shows, Right-Hand Drive Similar)

#### Removal Procedure

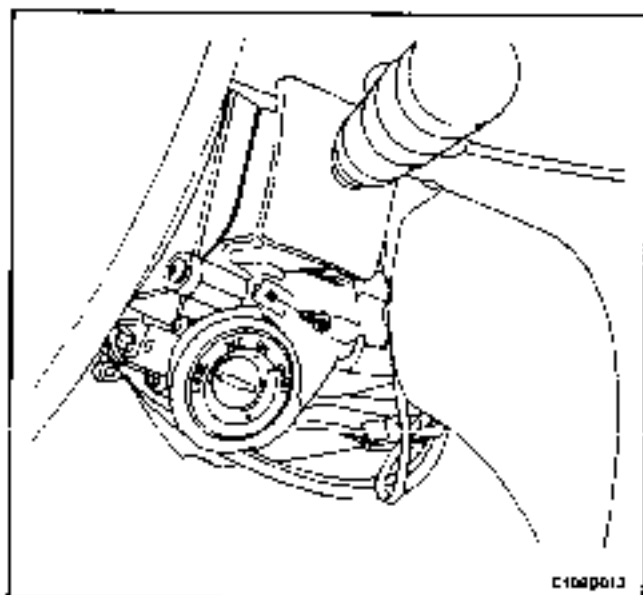
1. Disconnect the negative battery cable.
2. Remove the knee bolster trim panel.
3. Remove the screws and the steering column trim covers.



C106012



- 4 Remove the screw and the ignition switch keyhole lamp.
- 5 Remove the bulb.



### Installation Procedure

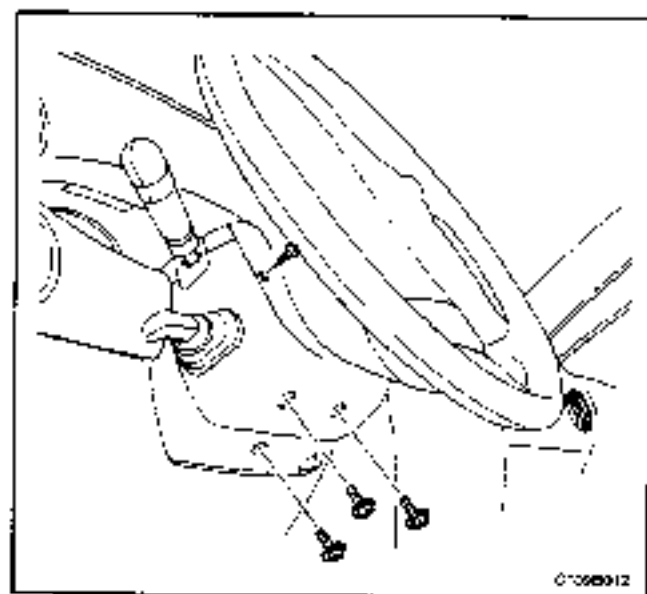
- 1 Install the replacement bulb into the ignition switch keyhole lamp.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

- 2 Install the ignition switch keyhole lamp with the screw.

### Tighten

Tighten the ignition switch keyhole lamp screw to 1.5 N·m (13 lb-in).



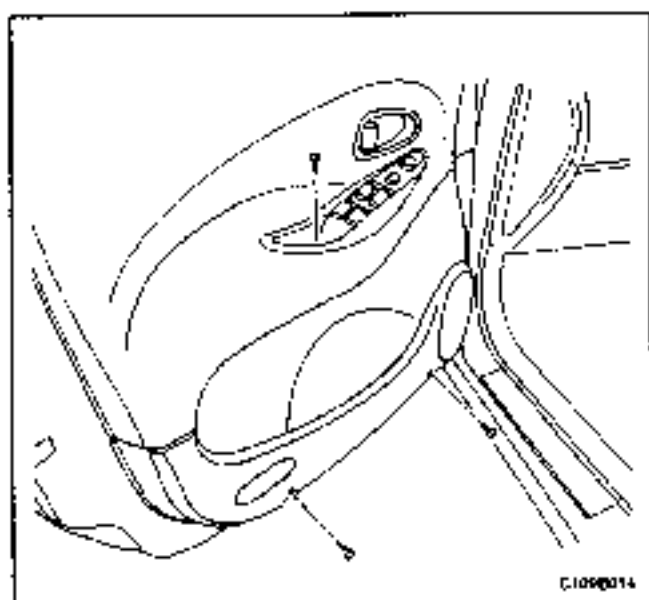
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

- 3 Install the steering column trim covers with the screws.

### Tighten

Tighten the steering column trim cover screws to N·m (lb-in).

- 4 Install the knee bolster trim panel.
- 5 Connect the negative battery cable.

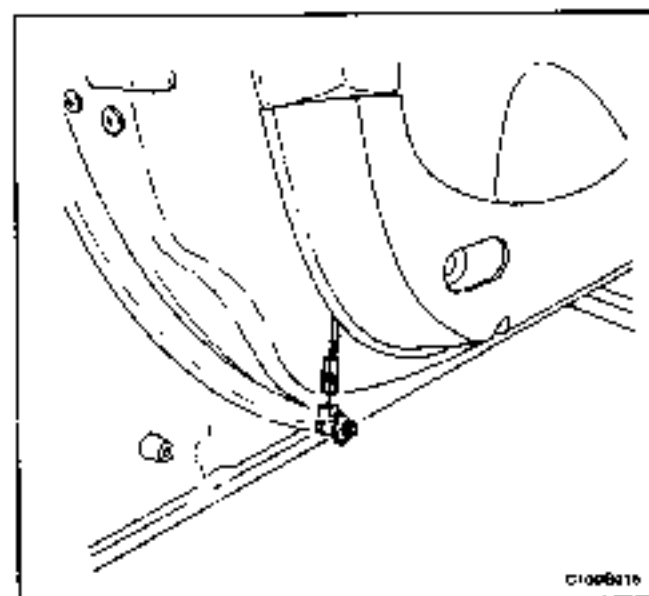


## FRONT DOOR STEP LAMP

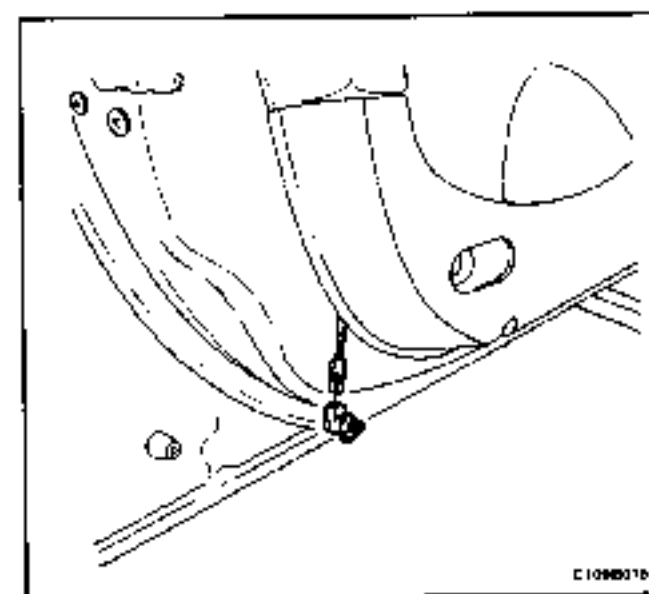
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the front door step lamp lens cover.
3. Remove the front door trim panel screws.



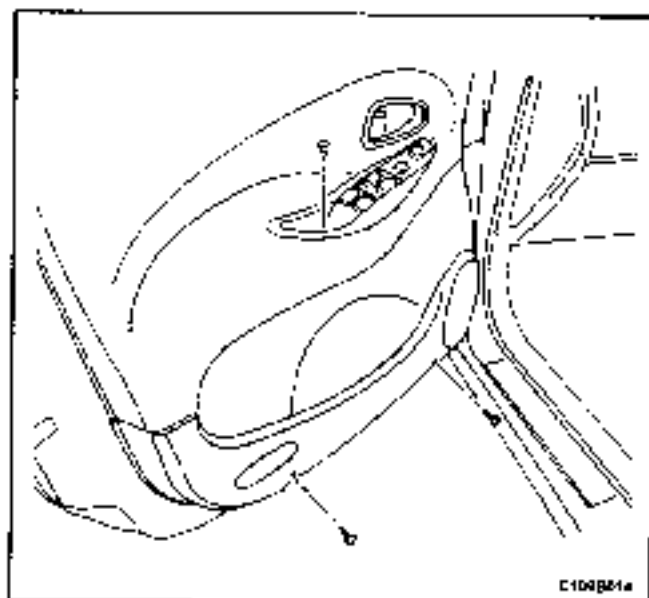
4. Reposition the lower half of the front door trim panel.
5. Remove the front door step lamp.
6. Disconnect the electrical connector.



### Installation Procedure

1. Connect the electrical connector.
2. Install the replacement front door step lamp bulb.
3. Install the lower half of the door trim panel to its original position.





C100B214

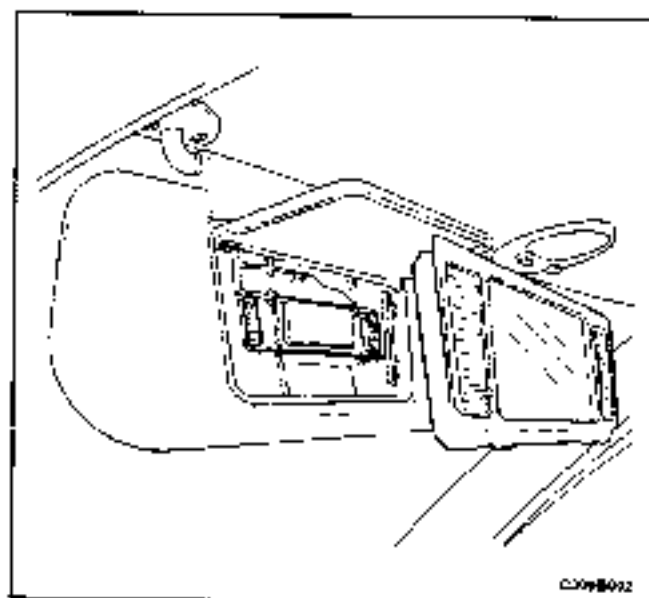
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

4. Install the front door trim panel screws.

#### **Tighten**

Tighten the front door trim panel screws to 3.5 N·m (31 lb·in).

5. Install the front door step lamp lens cover.
6. Connect the negative battery cable.

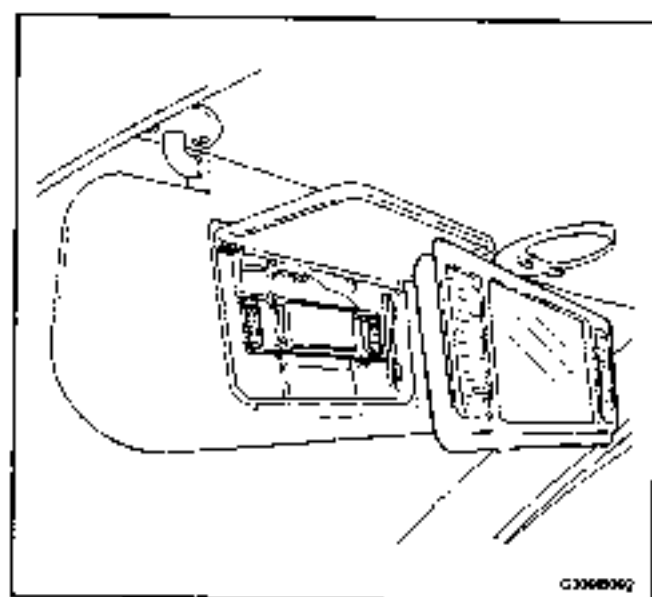


C306B092

### **VANITY MIRROR LAMP**

#### **Removal Procedure**

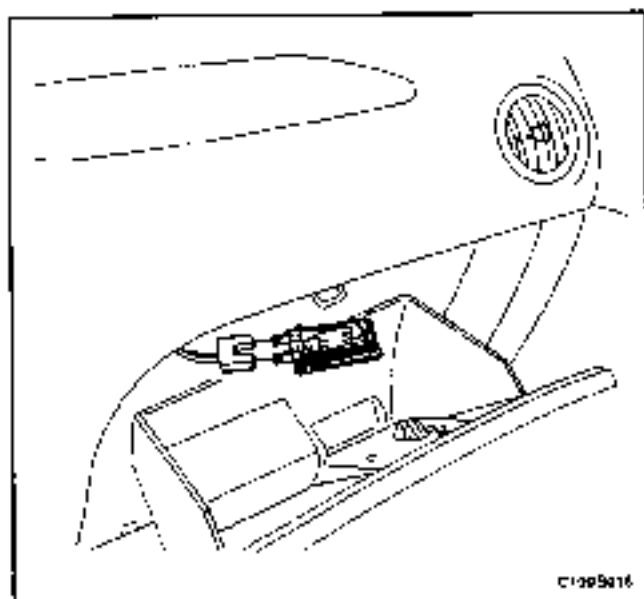
1. Disconnect the negative battery cable.
2. Pry off the vanity mirror lamp lens by inserting a screwdriver into the recess along the bottom edge of the lens.
3. Remove the inoperative bulb.



C306B092

#### **Installation Procedure**

1. Install a replacement bulb.
2. Press the vanity mirror lamp lens onto the housing.
3. Connect the negative battery cable.

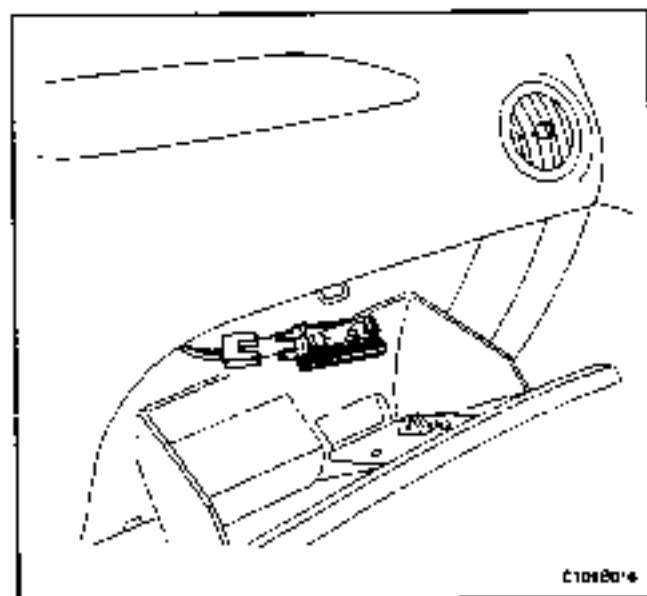


### GLOVE BOX LAMP

(Left-Hand Drive Shown, Right-Hand Drive Similar)

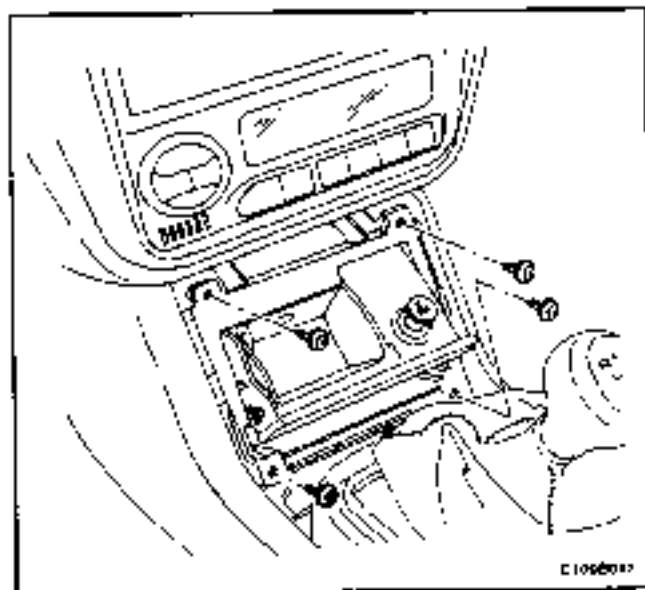
#### Removal Procedure

1. Disconnect the negative battery cable.
2. Open the glove box.
3. Remove the glove box lamp.
4. Disconnect the electrical connector.



#### Installation Procedure

1. Connect the electrical connector.
2. Install the glove box lamp.
3. Close the glove box.
4. Connect the negative battery cable.

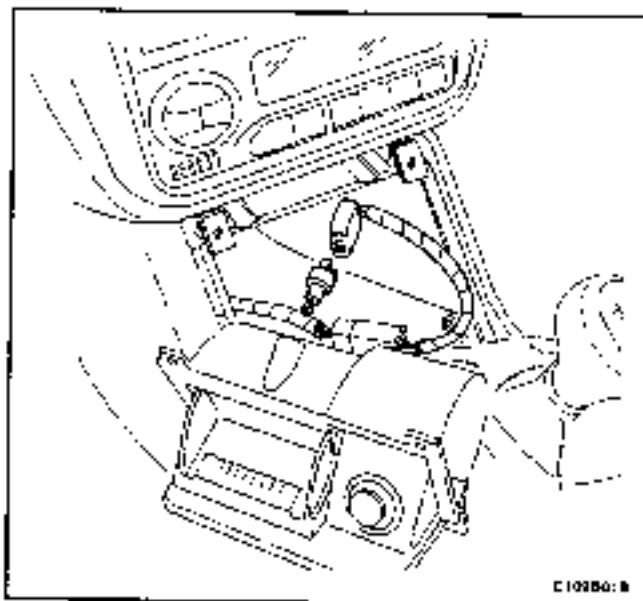


### ASHTRAY LAMP

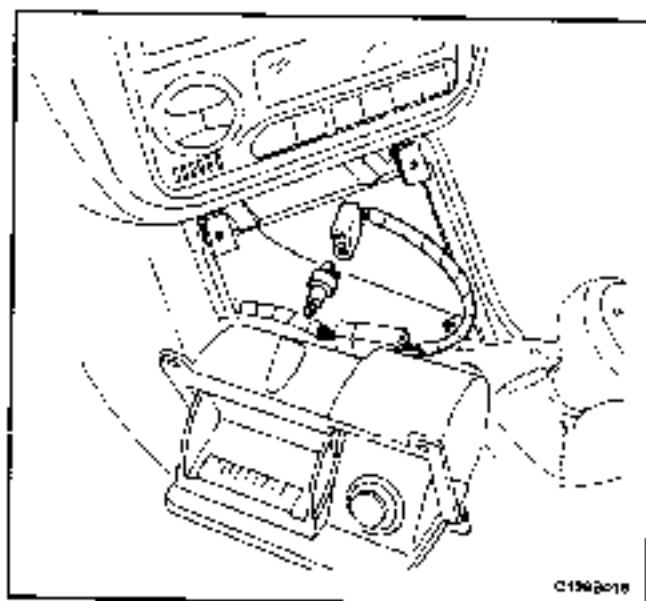
(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the shift lever trim plate.
3. Remove the screws and the ashtray housing.

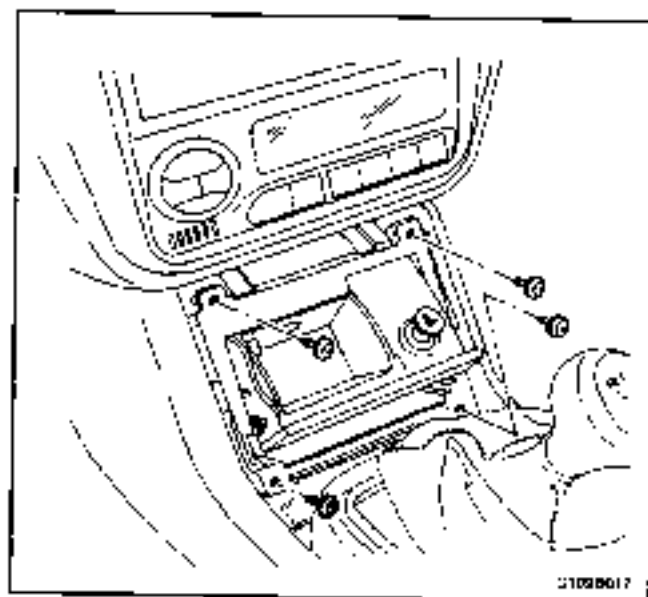


4. Remove the bulb from the ashtray lamp housing.
5. Disconnect the bulb from the ashtray lamp housing electrical connector.



### Installation Procedure

1. Connect the replacement bulb to the ashtray lamp housing electrical connector.
2. Install the replacement bulb into the ashtray lamp housing.



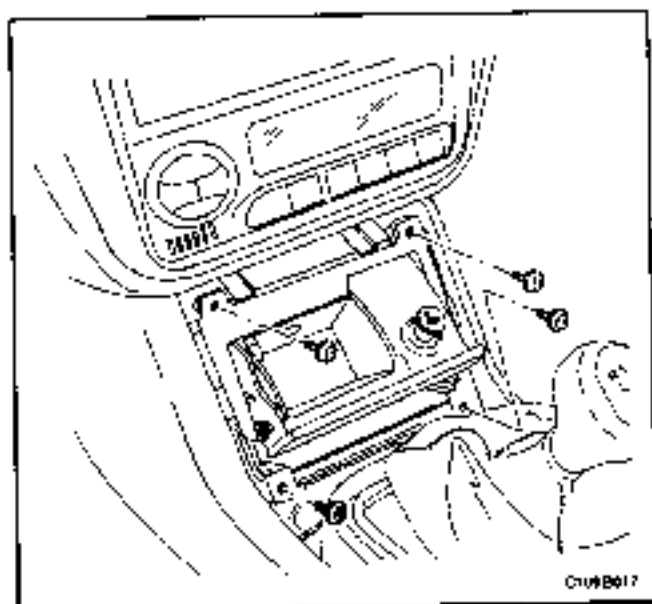
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the ashtray housing with the screws.

### Tighten

Tighten the ashtray housing screws to 2N·m (13lb·in).

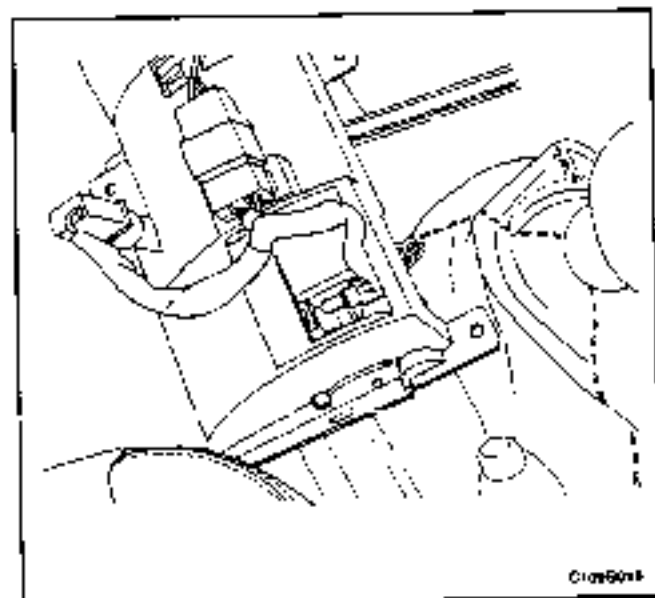
4. Install the shift lever trim plate.
5. Connect the negative battery cable.



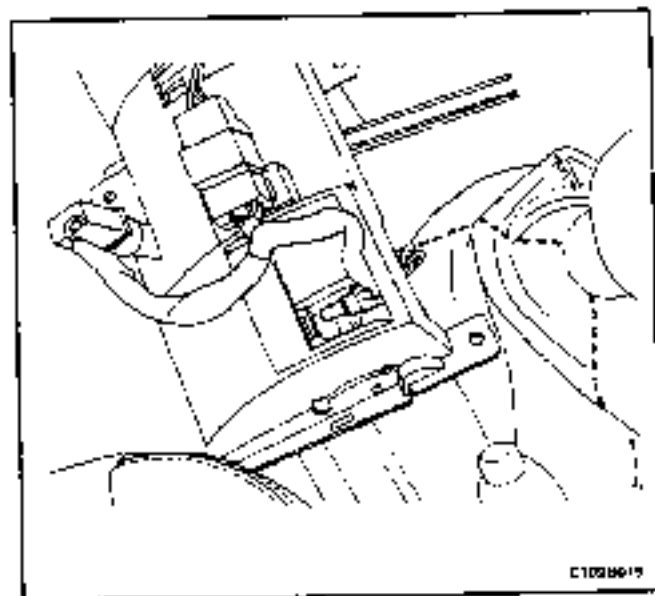
## CIGAR LIGHTER LAMP

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the shift lever trim plate.
3. Remove the screws and the ashtray housing.

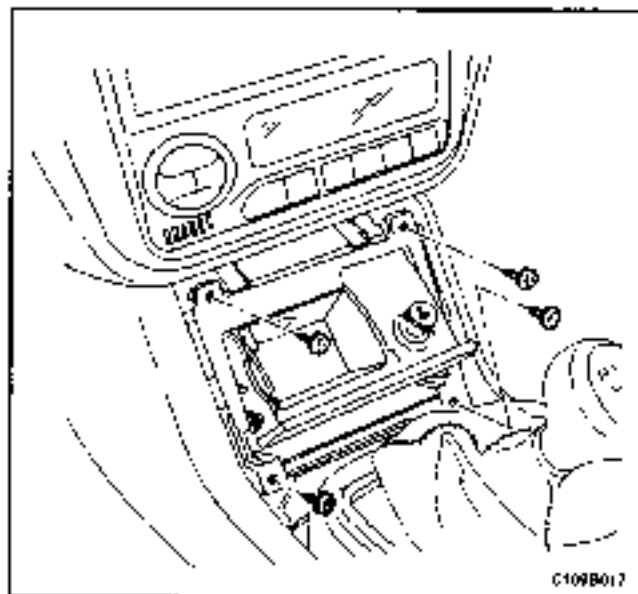


4. Remove the bulb from the cigar lighter lamp housing.
5. Disconnect the bulb from the cigar lighter lamp housing electrical connector.



### Installation Procedure

1. Connect the replacement bulb to the cigar lighter lamp housing electrical connector.
2. Install the replacement bulb into the cigar lighter lamp housing.



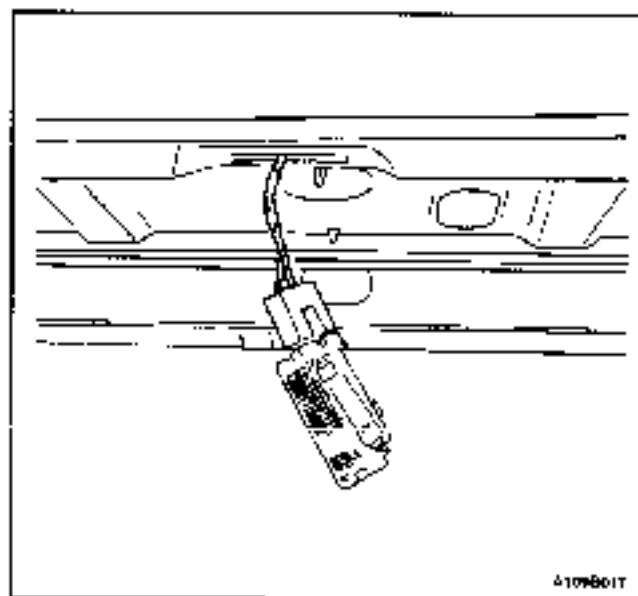
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the ashtray housing with the screws

#### **Tighten**

Tighten the ashtray housing screws to  $N\cdot m$  (lb- $ft$ )

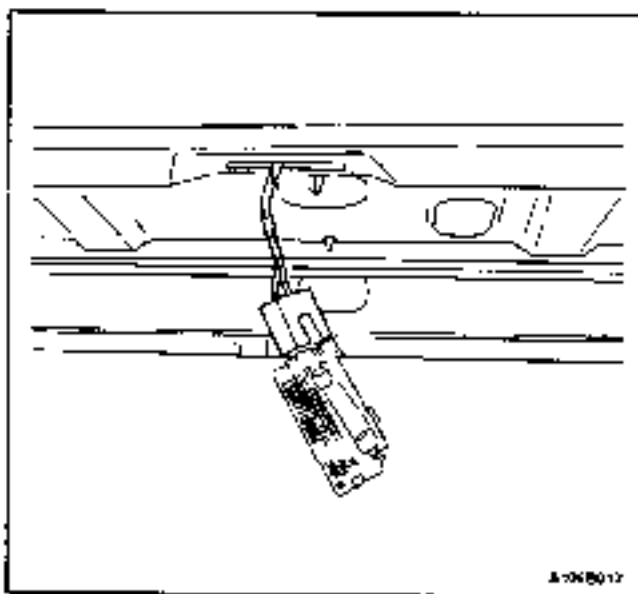
4. Install the shift lever trim plate
5. Connect the negative battery cable.



## **LUGGAGE COMPARTMENT LAMP**

### **Removal Procedure**

1. Disconnect the negative battery cable
2. Remove the luggage compartment lamp
3. Disconnect the electrical connector
4. Remove the bulb.



### **Installation Procedure**

1. Install a replacement bulb.
2. Connect the electrical connector.
3. Install the luggage compartment lamp.
4. Connect the negative battery cable.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### HEADLAMPS-ON REMINDER

When the headlamp switch is in the headlamps-on or parking lamps-on position, voltage is applied to the chime module. With the headlamp switch ON and the driver's door open, the module loses voltage. The module senses this change. If the voltage is still available, it is applied to sound the chime. The chime can be turned off by turning the headlamp switch to OFF or closing the driver's door. To replace the chime module, refer to Section 9E, *Instrumentation/Driver Information*.

### HEADLAMPS

The headlamps are controlled by the multifunction lever on the left side of the steering column. They will come on with the ignition switch in any position. Turning the headlamp switch to the first position turns on the parking lamps, the license plate lamps, and the instrument panel illumination. Turning the switch to the second position turns on all of the previous lamps and the headlamps. Turning the switch to the OFF position turns off all the lamps.

The headlamps high beam and low beams are also controlled by this lever. When the headlamps are on, pushing the lever away from the driver until the switch clicks changes the lamp from lowbeam to highbeam. An indicator lamp on the instrument cluster assembly will come on when the high-beam headlamps are on. To return the headlamps to low beams, pull the lever toward the driver.

The headlamps must be aimed for proper illumination of the road. Headlamp aim should be checked whenever a new headlamp assembly is installed or when service or repairs in the front end may have disturbed the headlamp assembly or its mountings.

### DAYTIME RUNNING LAMPS (DRL)

The daytime running lamps (DRL) work in conjunction with the exterior lighting system. During daylight, when the exterior lights are off, the DRL will automatically come on. At dusk, or when the light sensor detects darkness, the system will turn the exterior lights on and the DRL off. At dawn, or when the light sensor detects sufficient light, the system will turn the exterior lights off and the DRL on.

### PARKING AND TURN SIGNAL LAMPS

The parking lamps can be turned on by turning the lighting switch to the first position. The parking lamps can be turned off by turning the switch to the OFF position.

When the turn signals are activated, the appropriate turn signal lamps flash to signal a turn. The front, the rear,

and the side turn signals work only when the ignition switch is on.

The front, the rear, and the side turn signals are controlled by the light switch on the left side of the steering column. Moving the lever all the way up or down past the detent will turn on the turn signals. When the turn is complete, the lever will automatically release, and the front, the rear, and the side turn signals will stop flashing.

For changing lanes or shallow turn, in which the steering wheel does not turn far enough to cancel the signal, move the signal only to the first detent and hold it there. The turn signal will cancel when the lever is released.

### FOG LAMPS

The front and the rear fog lamp switches are on the instrument panel above the audio system. To use the fog lamps, first turn on the headlamps or the parking lamps. Then push the appropriate fog lamp switch. The indicator light in the instrument cluster will illuminate to indicate that the fog lamps are on. Push the switch again to turn off the fog lamps. The indicator light will then go off.

The front fog lamps should not be used as a substitute for the headlamps.

The front fog lamps must be aimed for proper illumination of the road. Front fog lamp aim should be checked when a new bulb is installed or if service or repairs in the front end may have disturbed the front fog lamp assembly or its mountings.

### REAR COMBINATION LAMPS

The taillamps, stoplamps, backup lamps, turn signals, and rear fog lamps are one assembly.

Turning on either the headlamps or the parking lamps will also turn on the taillamps. When the brake pedal is pushed, the taillamps will glow more brightly to serve as stoplamps.

### CENTER HIGH-MOUNTED STOPLAMP

The center high-mounted stoplamp is located in the rear window and will come on when the brake pedal is pressed.

### BACKUP LAMPS

The backup lamps will come on when the transaxle is shifted into reverse. On a vehicle with an automatic transaxle, the backup lamps are activated by the neutral safety backup (NSBU) switch. On a vehicle with a manual transaxle, they are activated by a reverse switch which is part of the transaxle.

## LICENSE PLATE LAMPS

The license plate lamps will come on when the headlamps or the parking lamps are on. The license plate lamps are mounted on the rear deck lid, above the license plate.

## INTERIOR COURTESY LAMP

The courtesy lamp is located on the headliner. The lamp switch has three positions. If the switch is left in the center position, the lamp will go on whenever a door is opened and go off when it is closed. In the on position, the lamp will stay on until it is turned off. In the OFF position, the lamp will not come on, even when a door is opened.

## ILLUMINATED VANITY MIRRORS

The illuminated vanity mirrors are located on the back of both sun visors. The sun visors contain an internal switch. When the mirror cover is opened, the switch is closed, and the vanity mirror bulbs illuminate. When the cover is closed, the switch is opened, and the vanity mirror bulbs turn off.

## ASHTRAY LAMP AND CIGAR LIGHTER

An ashtray lamp is mounted above the ashtray. An illumination ring lamp is mounted around the cigar lighter. Both lamps will come on when the parking lamps or the headlamps are turned on.

## LUGGAGE COMPARTMENT LAMP

The luggage compartment lamp is located under the deck lid sill plate. It will come on whenever the luggage compartment is opened.

## HEADLAMP LEVELING

The headlamp leveling switch is on the instrument panel to the left of the steering wheel. The headlamp leveling adjusts the headlamps up or down when the low-beam headlamps are ON. A headlamp leveling motor is attached to the rear of both headlamps. To replace the headlamp leveling switch, refer to *Section 9E, Instrumentation/Driver Information*.





## SECTION 9C

# HORNS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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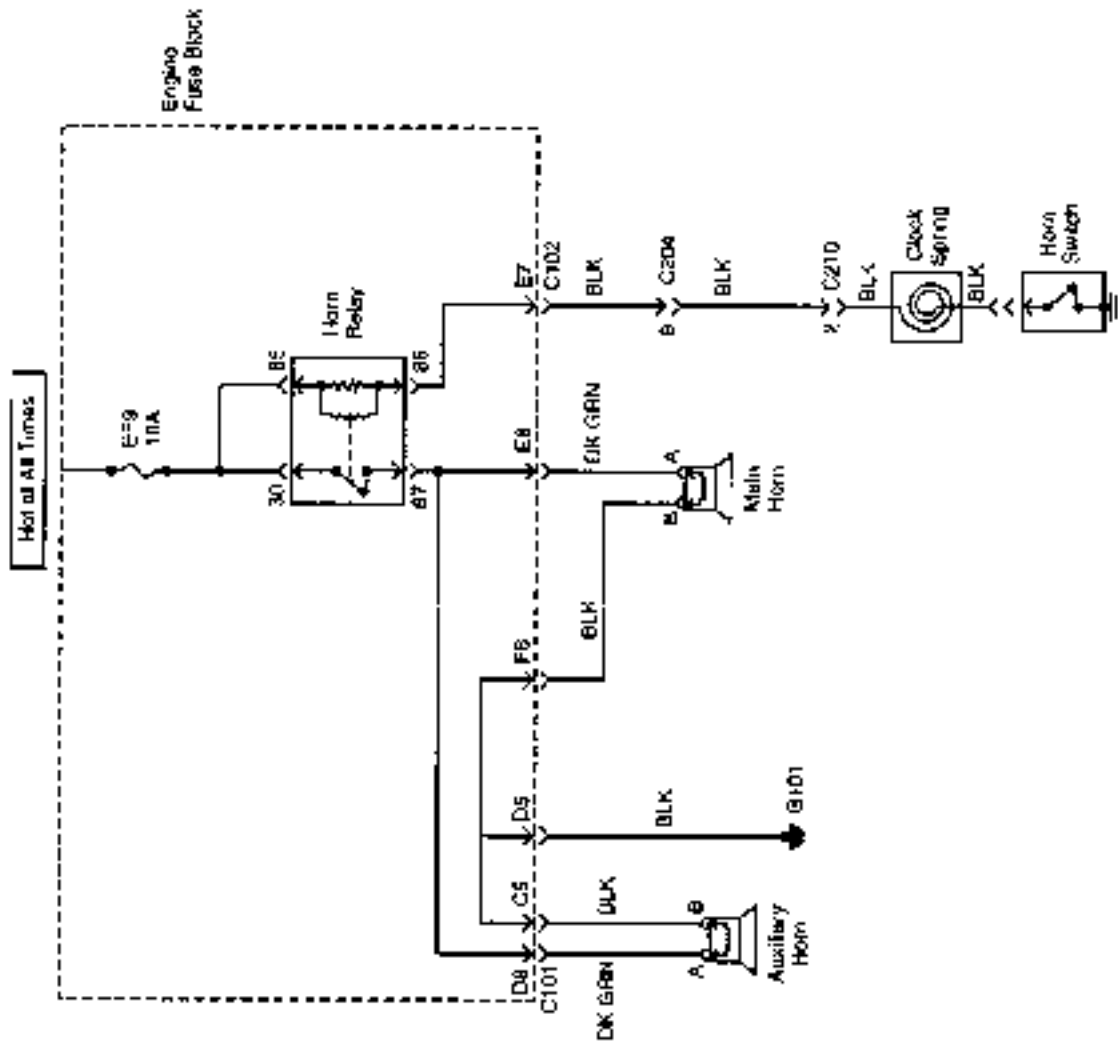
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·ft	Lb·In
Horn Bolt	22	16	-

# SCHEMATIC AND ROUTING DIAGRAMS

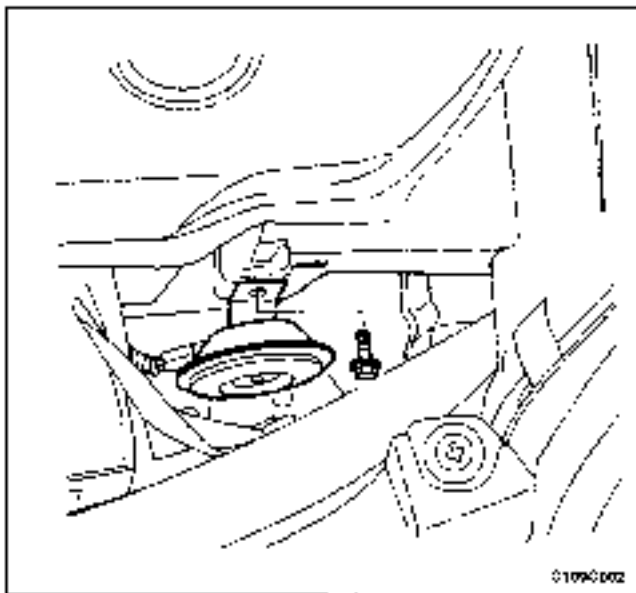
## HORN WIRING SYSTEM



G209C001

**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****DUAL HORNS****Removal Procedure**

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector.
3. Remove the bolt and the horn (left horn shown, right horn similar).

**Installation Procedure**

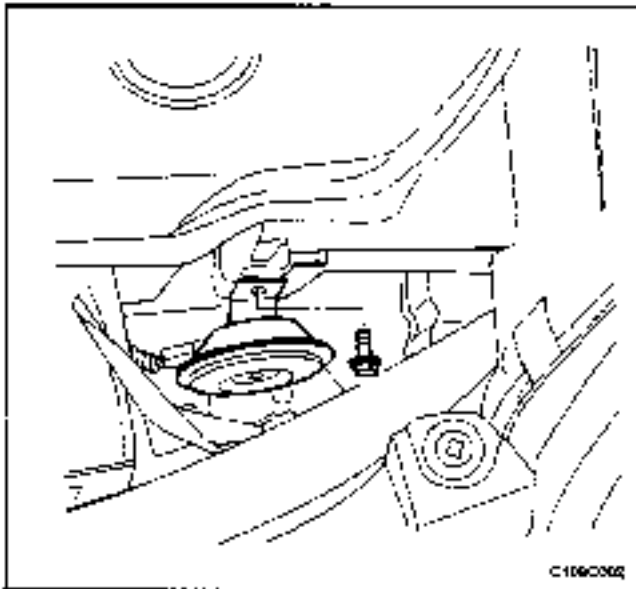
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the horn with the bolt (left horn shown, right horn similar).

**Tighten**

Tighten the horn bolt to 22 N·m (16 lb-ft).

2. Connect the electrical connector.
3. Connect the negative battery cable.



## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **HORNS**

The horns are located under the hood. They are attached near the radiator at the front of the vehicle. The horns are actuated by pressing the steering wheel pad, which grounds the horns' electrical circuit.

## SECTION 9D

# WIPERS/WASHER SYSTEMS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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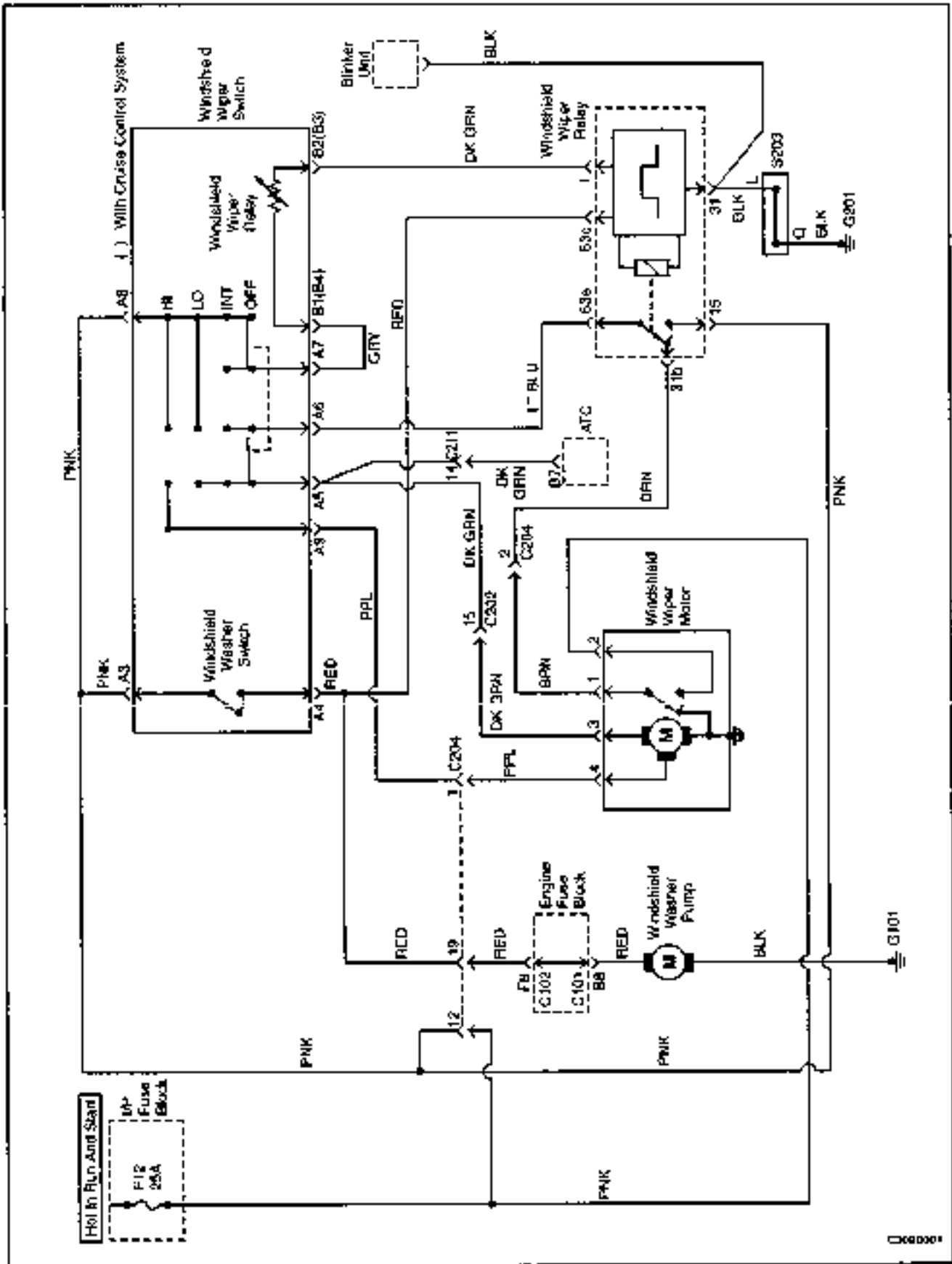
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Cowl Vent Grille Screw	2.5	-	22
Washer Fluid Reservoir Bolts	9	-	80
Wiper Arm Linkage Nut	11	-	97
Wiper Arm Nut	7	-	62
Wiper Motor Bolts	4	-	36

**SCHEMATIC AND ROUTING DIAGRAMS**

**WINDSHIELD WIPERS AND WASHER SYSTEM**



1000001

## DIAGNOSIS

## TWO-SPEED INTERMITTENT WINDSHIELD WIPERS

## Windshield Wipers Do Not Work At Any Speed

Step	Action	Value	Yes	No
1	Check fuse F12. Is fuse F12 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	Check the voltage at fuse F12. Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit to fuse F12. Is the repair complete?	-	System OK	-
5	1. Disconnect the wiper motor connector. 2. Turn the ignition ON. 3. Turn the wiper switch to HI. 4. Check the voltage at the wiper motor connector terminal 4. Is the voltage equal to the specified value?	11-14 v	Go to Step 6	Go to Step 7
6	Replace the wiper motor. Is the repair complete?	-	System OK	-
7	1. The wiper switch is still disconnected. 2. Turn the ignition ON. 3. Check for battery voltage at the wiper switch connector terminal A8. Is the voltage equal to the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between the wiper switch connector terminal A8 and fuse F12. Is the repair complete?	-	System OK	-
9	1. The wiper switch is still disconnected. 2. Turn the wiper switch to HI. 3. Use an ohmmeter to check for continuity between the wiper switch connector terminal A8 and A9. Does the ohmmeter indicate the specified value?	0 $\Omega$	Go to Step 11	Go to Step 10
10	Replace the wiper switch. Is the repair complete?	-	System OK	-
11	Repair the open circuit between the wiper switch and the wiper motor. Is the repair complete?	-	System OK	-

## Windshield Wipers Do Not Work On HI Speed, LO Speed OK

Step	Action	Value	Yes	No
1	1. Turn the ignition ON. 2. Turn the wiper switch to HI. 3. Check voltage at the wiper motor connector terminal 4. Is the voltage equal to the specified value?	11-14 v	Go to Step 2	Go to Step 3
2	Replace the wiper motor. Is the repair complete?	-	System OK	-
3	1. Disconnect the wiper switch. 2. Turn the wiper switch to HI. 3. Use an ohmmeter to check for continuity between the wiper switch connector terminal A8 and A9. Does the ohmmeter indicate the specified value?	0 $\Omega$	Go to Step 5	Go to Step 4
4	Replace the wiper switch. Is the repair complete?	-	System OK	-
5	Repair the open circuit between the wiper switch connector terminal A9 and the wiper motor connector terminal 4. Is the repair complete?	-	System OK	-

## Windshield Wipers Do Not Work On LO Speed, HI Speed OK

Step	Action	Value	Yes	No
1	1. Turn the ignition ON. 2. Turn the wiper switch to LO. 3. Check the voltage at the wiper motor connector terminal 3. Is the voltage equal to the specified value?	11-14 v	Go to Step 2	Go to Step 3
2	Replace the wiper motor. Is the repair complete?	-	System OK	-
3	1. Disconnect the wiper switch. 2. Turn the wiper switch to LO. 3. Use an ohmmeter to check for continuity between the wiper switch connector terminal A8 and A5. Does the ohmmeter indicate the specified value?	0 $\Omega$	Go to Step 5	Go to Step 4
4	Replace the wiper switch. Is the repair complete?	-	System OK	-
5	Repair the open circuit between the wiper switch connector terminal A5 and the wiper motor connector terminal 3. Is the repair complete?	-	System OK	-



## Windshield Wipers Do Not Work On Intermittent, Other Speeds OK

Step	Action	Value	Yes	No
1	1. Turn the ignition ON. 2. Use a voltmeter to test voltage at the wiper relay connector terminal 15. Is voltage equal to the specified value?	11-14 v	Go to Step 3	Go to Step 2
2	Repair the open circuit between the wiper relay connector terminal 15 and fuse F12. Is the repair complete?	-	System OK	-
3	1. Turn the ignition ON. 2. Turn the wiper switch to INT. 3. Check the voltage at the wiper relay connector terminal 1. Does the voltmeter indicate a voltage equal to the specified value?	11-14 v	Go to Step 7	Go to Step 4
4	Check for an open circuit between wiper switch connector terminal B2 (B3, if equipped cruise control system) and wiper relay connector terminal 1. Is there an open circuit?	-	Go to Step 6	Go to Step 5
5	Replace the wiper switch. Is the repair complete?	-	System OK	-
6	Repair the open circuit between wiper switch connector terminal B2 (B3, if equipped cruise control system) and wiper relay connector terminal 1. Is the repair complete?	-	System OK	-
7	1. Turn the ignition ON. 2. Turn the wiper switch to INT. 3. Check the voltage pulsing at the wiper relay connector terminal 53e. Does the voltmeter indicate a pulsating voltage equal to the specified value?	11-14 v	Go to Step 11	Go to Step 8
8	Using an ohmmeter, check the resistance between ground and the wiper relay connector terminal 31. Is resistance equal to the specified value?	0 $\Omega$	Go to Step 10	Go to Step 9
9	Repair the open ground circuit. Is the repair complete?	-	System OK	-
10	Replace the wiper relay. Is the repair complete?	-	System OK	-
11	1. Turn the ignition ON. 2. Check the voltage at the wiper switch connector terminal A6. Is the voltage pulsating at the specified value?	-	Go to Step 12	Go to Step 13
12	Replace the wiper switch. Is the repair complete?	-	System OK	-
13	Repair the open circuit between the wiper switch and the wiper relay. Is the repair complete?	-	System OK	-

## Windshield Wipers Do Not Return To Park Position

Step	Action	Value	Yes	No
1	1. Turn the ignition ON. 2. Check the voltage at the wiper motor connector terminal 2. Is the voltage equal to the specified value?	11-14 v	Go to Step 3	Go to Step 2
2	Repair the open circuit between the wiper motor and fuse F12. Is the repair complete?	-	System OK	-
3	1. Turn the wiper switch to HI. 2. While turning the wiper switch OFF, check the voltage at the wiper motor connector terminal 3. Is the specified voltage indicated when the wiper switch is turned OFF?	11-14 v	Go to Step 5	Go to Step 4
4	Replace the wiper motor. Is the repair complete?	-	System OK	-
5	1. Disconnect the wiper relay. 2. Check continuity between the wiper relay terminal 31b and 53e. Does the ohmmeter indicate the specified value?	0 Ω	Go to Step 6	Go to Step 7
6	Repair the open circuit between the wiper motor and the wiper relay. Is the repair complete?	-	System OK	-
7	Replace the wiper relay. Is the repair complete?	-	System OK	-

**WINDSHIELD WASHER SYSTEM****Windshield Washer Inoperative, Wipers Work OK**

Step	Action	Value	Yes	No
1	Activate the windshield washer switch. Do the windshield wipers operate when the washer switch is activated?	-	Go to Step 4	Go to Step 2
2	1. Turn the ignition ON. 2. While activating the washer switch, test the voltage at the windshield wiper switch connector terminal A4. Is the voltage equal to the specified value?	11-14 v	Go to Step 8	Go to Step 3
3	Replace the wiper switch. Is the repair complete?	-	System OK	-
4	Check the windshield washer fluid reservoir. Is there washer fluid in the fluid reservoir?	-	Go to Step 6	Go to Step 5
5	Fill the windshield washer fluid reservoir. Is the repair complete?	-	System OK	-
6	Check the windshield washer hoses and the nozzles. Are the windshield washer hoses and the nozzles clogged or damaged?	-	Go to Step 7	Go to Step 8
7	Repair the washer hoses and the nozzles. Is the repair complete?	-	System OK	-
8	1. Turn the ignition ON. 2. With the windshield washer activated, test the voltage at the windshield washer pump. Is the voltage equal to the specified value?	11-14 v	Go to Step 10	Go to Step 9
9	Repair an open circuit between the windshield washer pump and the windshield wiper switch. Is the repair complete?	-	System OK	-
10	Use an ohmmeter to measure the resistance between ground and the windshield washer pump. Is the resistance equal to the specified value?	0 Ω	Go to Step 12	Go to Step 11
11	Repair the windshield washer pump ground circuit. Is the repair complete?	-	System OK	-
12	Replace the windshield washer pump. Is the repair complete?	-	System OK	-

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### WINDSHIELD WIPER ARM

(Left-Hand Drive Shown, Right-Hand Drive Similar)

##### Removal Procedure

1. Open the hood.
2. Remove the nut from the wiper arm.
3. Pull the wiper arm off.

##### Installation Procedure

1. Install the wiper arm.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Secure the wiper arm with the nut.

##### Tighten

Tighten the wiper arm nut to 7 N•m (62 lb-in).

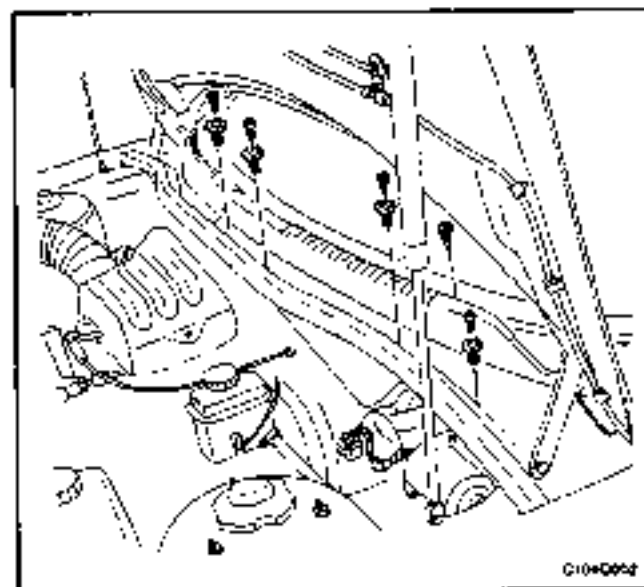
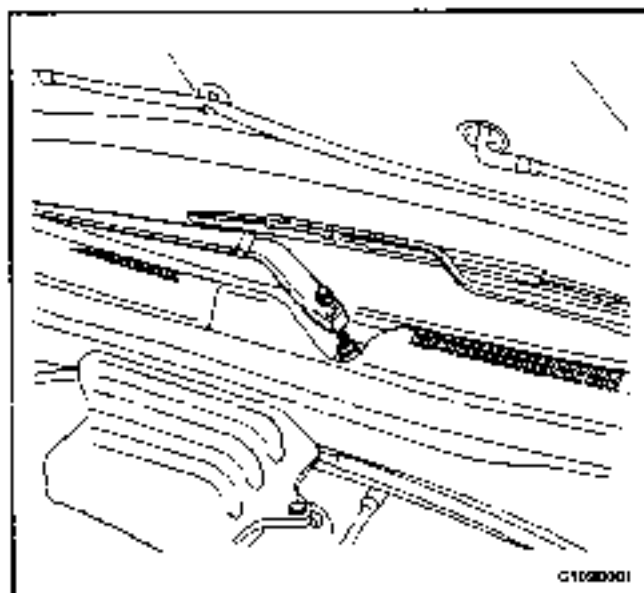
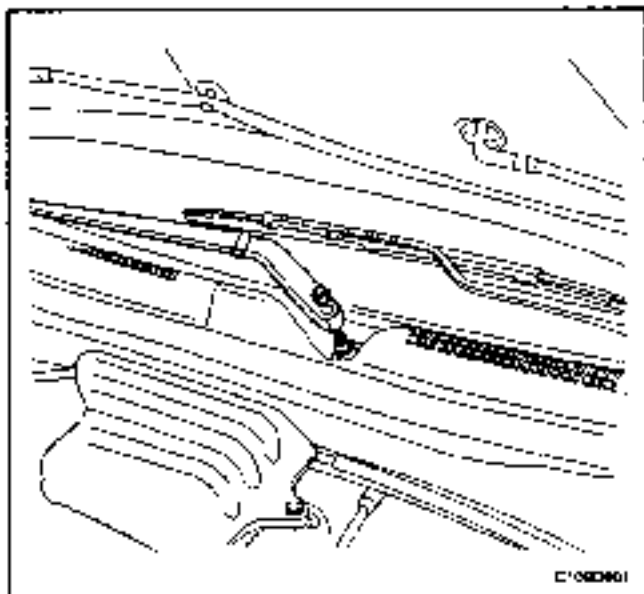
3. Close the hood.

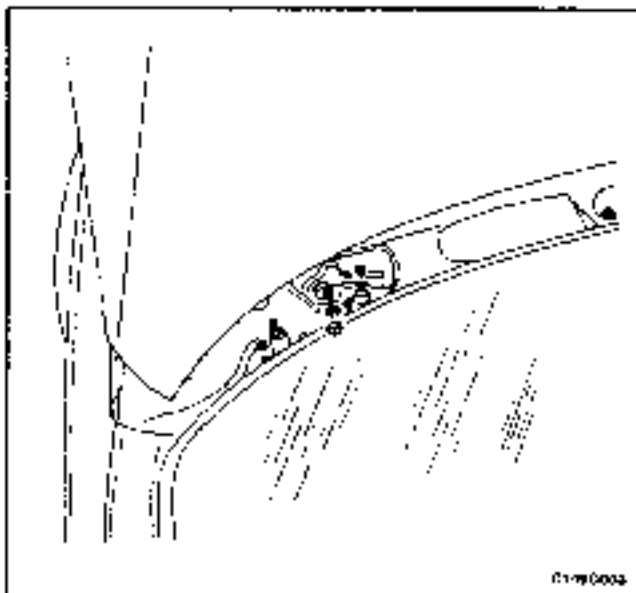
#### WINDSHIELD WIPER MOTOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

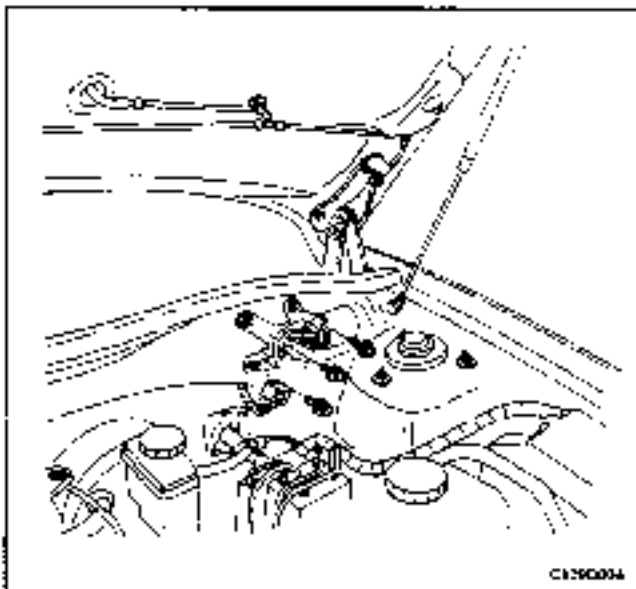
##### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the screws and the left side portion of the cowl vent grille.

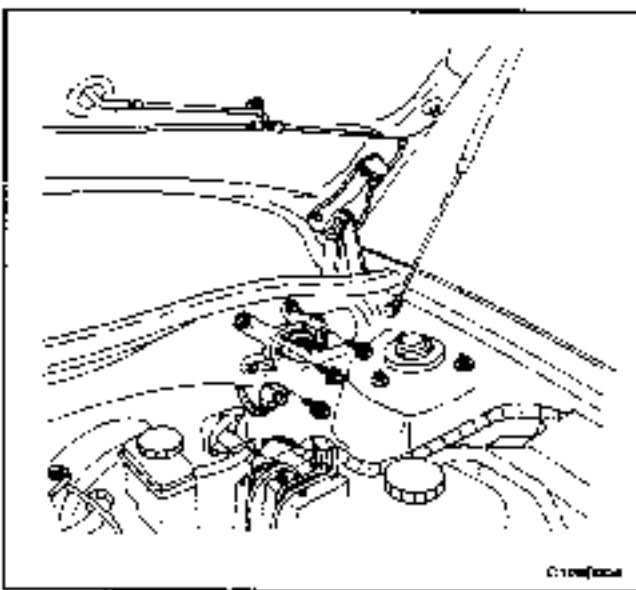




3. Remove the nut and the washer securing the wiper arm linkage to the motor drive shaft.



4. Pry the wiper arm linkage off the motor drive shaft.
5. Disconnect the electrical connector.
6. Remove the bolts and the wiper motor.



### Installation Procedure

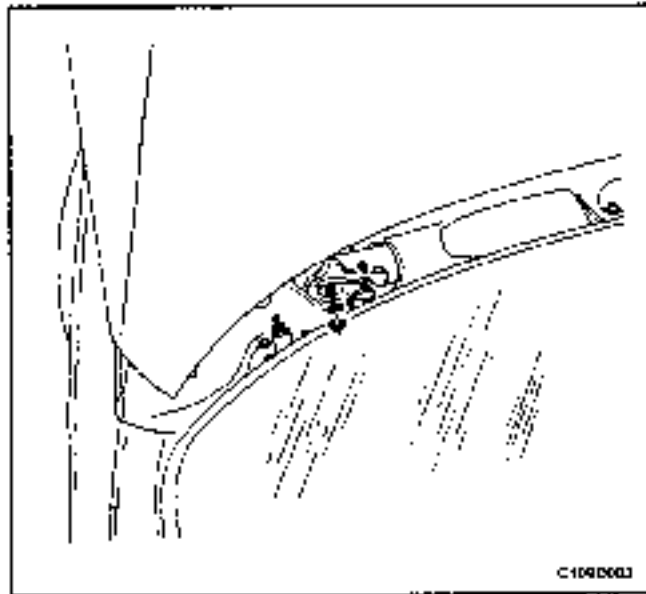
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the wiper motor with the bolts.

#### Tighten

Tighten the wiper motor bolts to 4 N•m (36 lb-in).

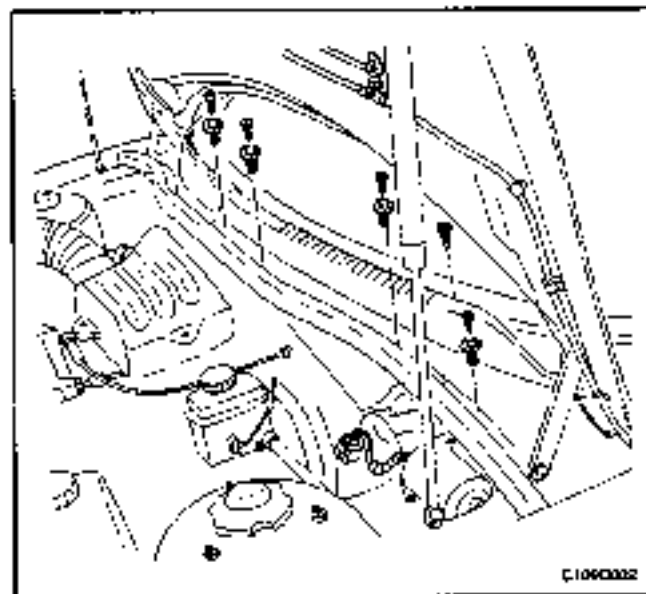
2. Connect the electrical connector.



3. Press the wiper arm linkage onto the motor drive shaft.
4. Install the wiper arm linkage to the motor drive shaft with the washer and the nut.

**Tighten**

Tighten the wiper arm linkage nut to 11 N·m (8 lb-ft).

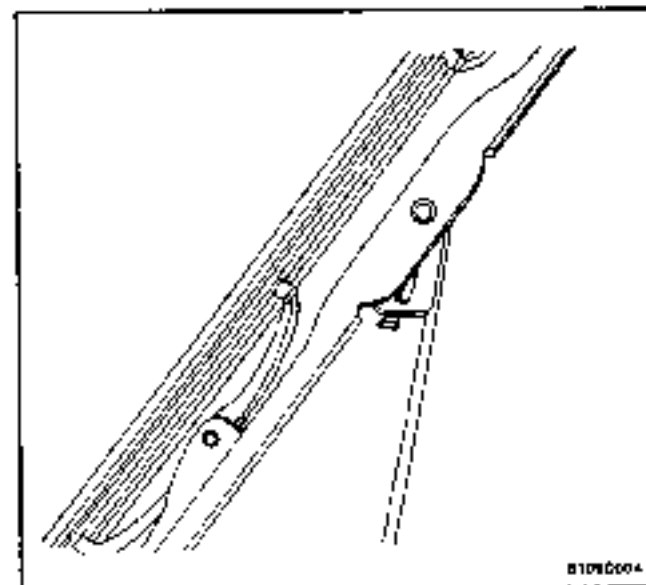


5. Install the left side portion of the cowl vent grille with the screws.

**Tighten**

Tighten the cowl vent grille screw to 2.5 N·m (2 lb-ft).

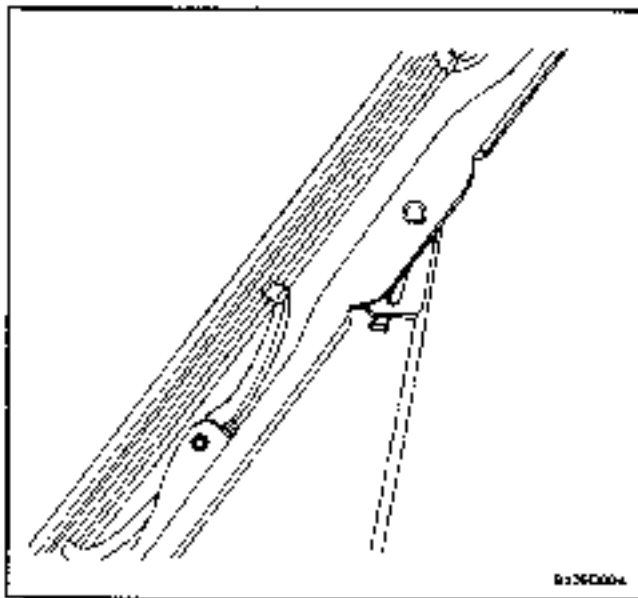
6. Connect the negative battery cable.



**WINDSHIELD WIPER BLADE**

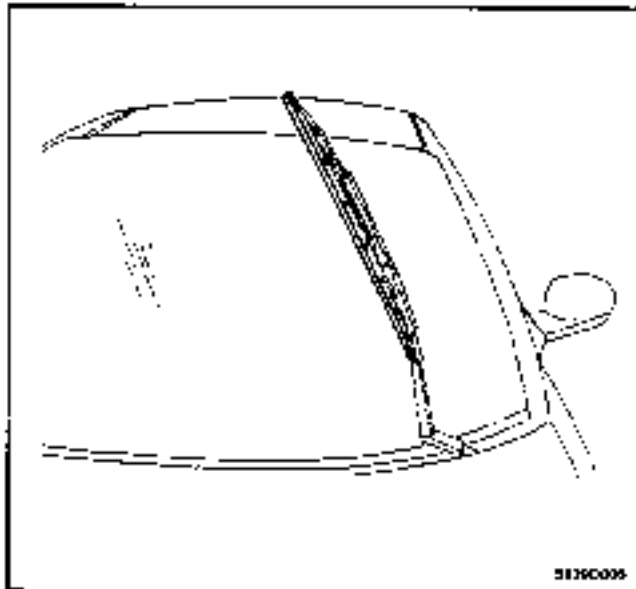
**Removal Procedure**

1. Rotate the wiper blade on the arm.
2. While pressing the retainer clip, slide the wiper blade down the wiper arm and remove the blade.



#### Installation Procedure

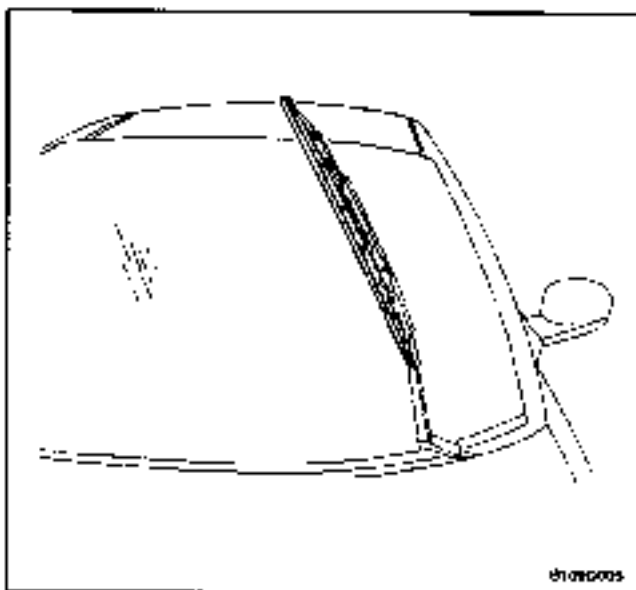
1. Install the wiper blade by sliding it onto the arm until the retainer clip engages.



#### WINDSHIELD WIPER BLADE INSERT

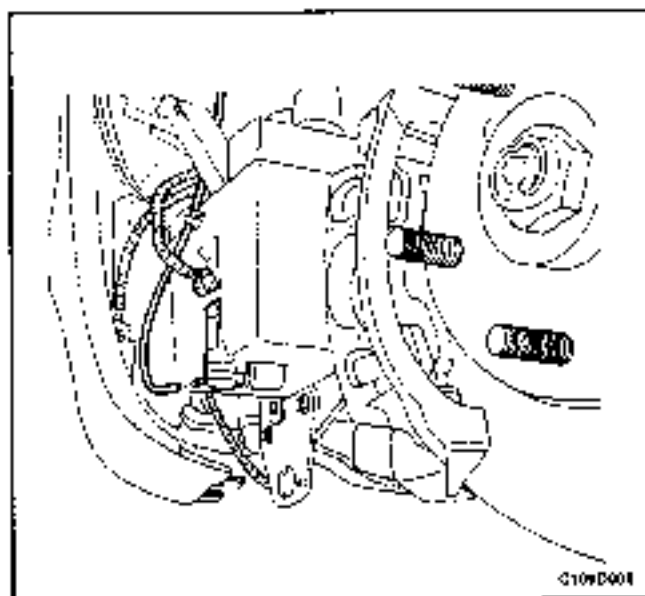
##### Removal Procedure

1. Slide the insert out of the wiper blade.



##### Installation Procedure

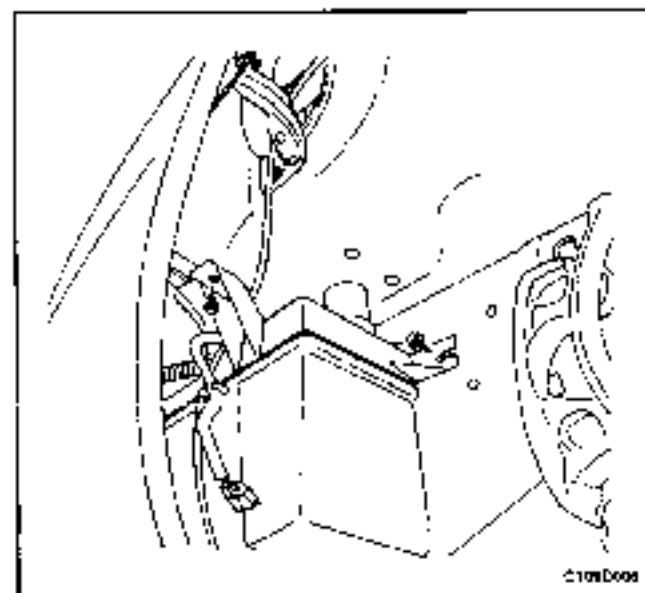
1. Slide the insert into the wiper blade.



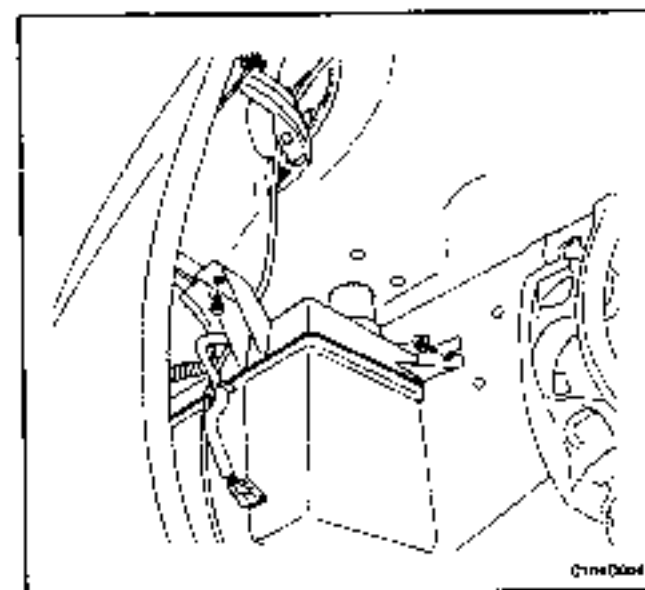
## WINDSHIELD WASHER RESERVOIR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the front left wheel. Refer to Section 2E, *Tires and Wheels*.
3. Remove the front wheel well splash shield. Refer to Section 9R, *Body Front End*.
4. Disconnect the washer hose from the washer pump.
5. Disconnect the reservoir pump electrical connector.



6. Remove the bolts and the reservoir.



### Installation Procedure

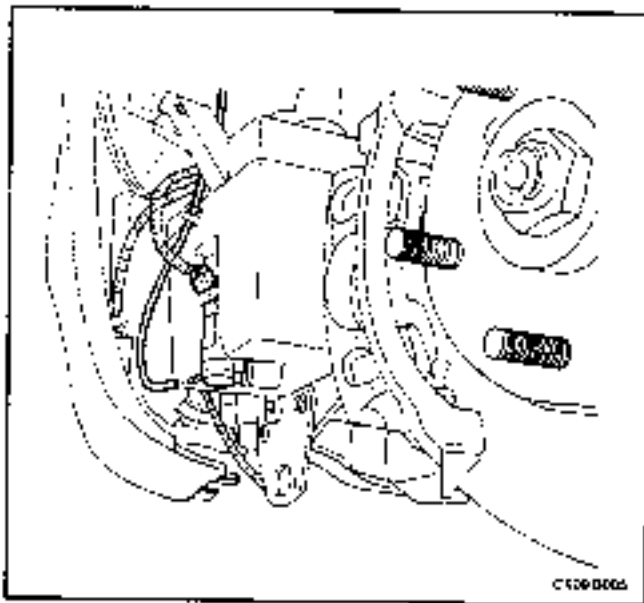
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the reservoir with the bolts.

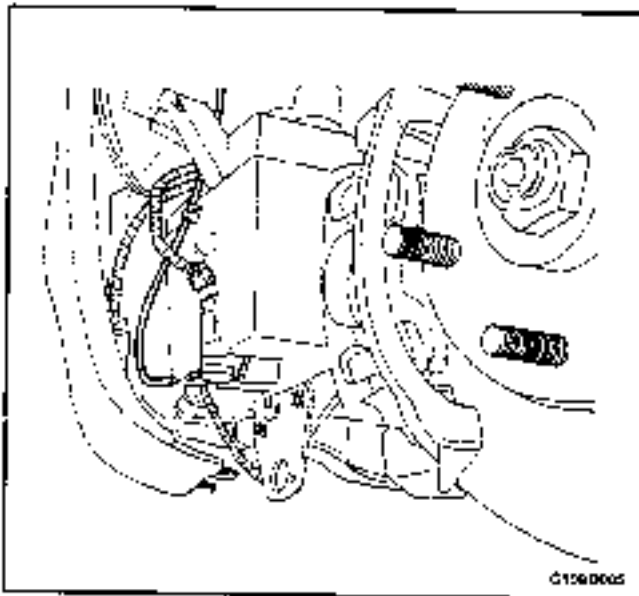
#### Tighten

Tighten the washer fluid reservoir bolts to 9 N·m (7 lb-ft).





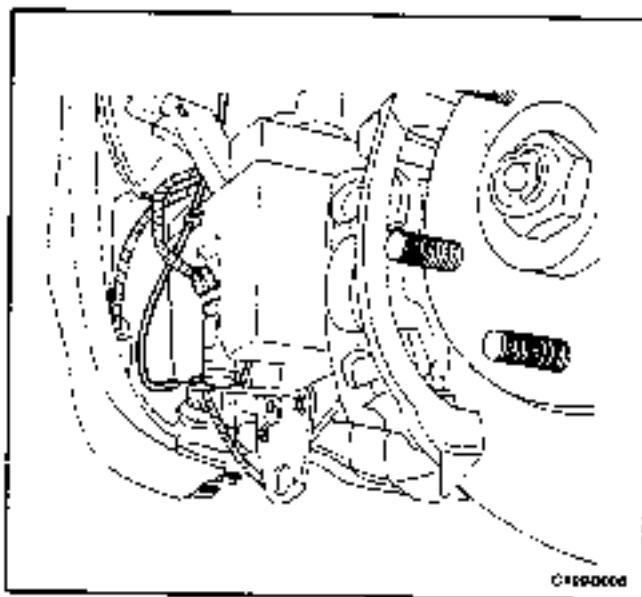
2. Connect the reservoir pump electrical connector.
3. Connect the washer hose to the washer pump.
4. Install the front wheel well splash shield. Refer to *Section 9R, Body Front End*.
5. Install the front left wheel. Refer to *Section 2E, Tires and Wheels*.
6. Connect the negative battery cable.



## WINDSHIELD WASHER PUMP

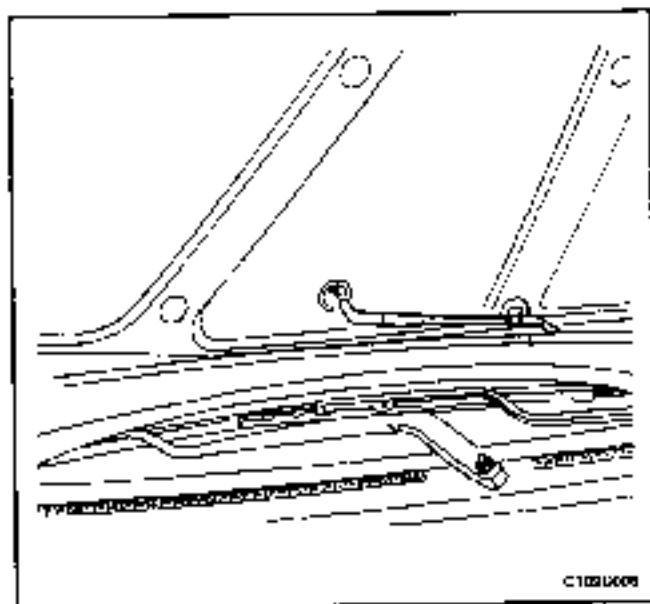
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the left front wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the front wheel well splash shield. Refer to *Section 9R, Body Front End*.
4. Disconnect the electrical connector.
5. Disconnect the washer hose from the washer pump.
6. Remove the washer pump.



### Installation Procedure

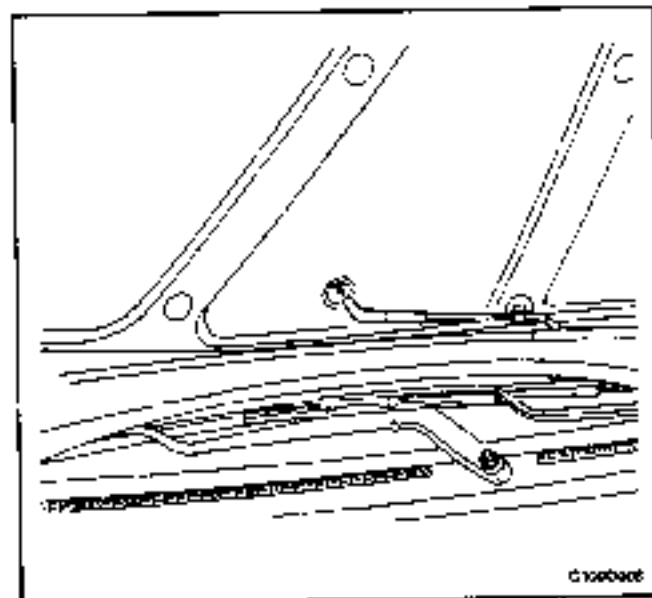
1. Install the washer pump.
2. Connect the washer hose to the washer pump.
3. Connect the electrical connector.
4. Install the front wheel well splash shield. Refer to *Section 9R, Body Front End*.
5. Install the left front wheel. Refer to *Section 2E, Tires and Wheels*.
6. Connect the negative battery cable.



## WINDSHIELD WASHER NOZZLES

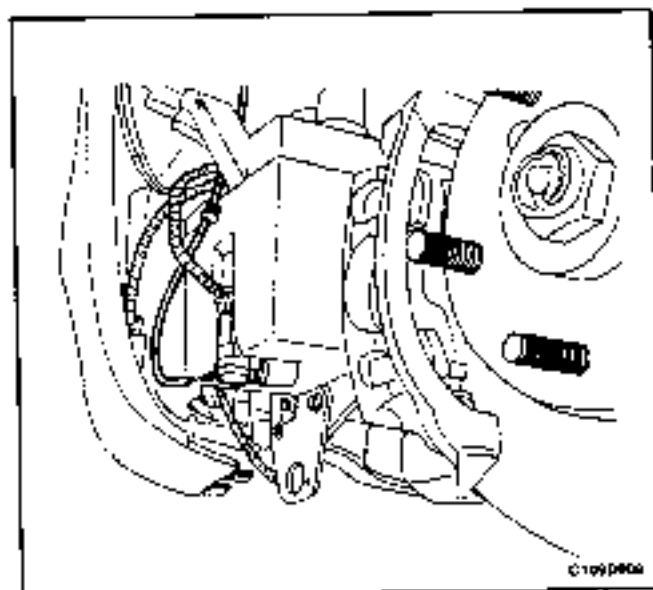
### Removal Procedure

1. Open the hood.
2. Disconnect the washer hose from the nozzle.
3. Remove the nozzle from the hood.



### Installation Procedure

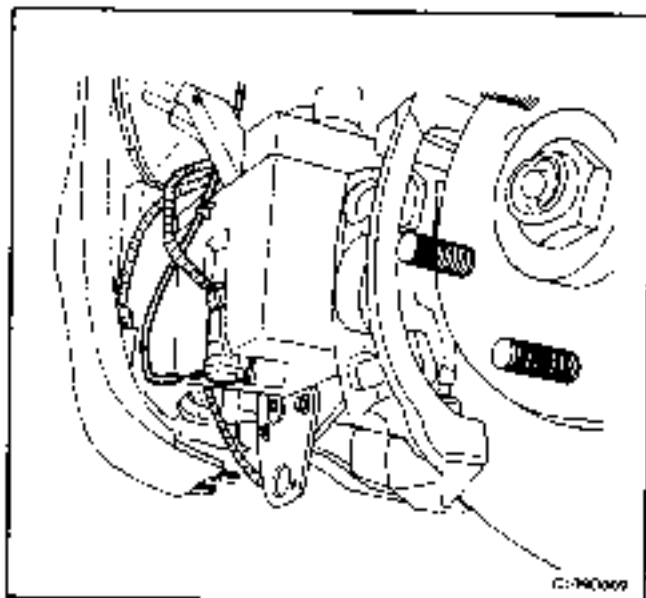
1. Install the nozzle onto the hood.
2. Connect the washer hose to the nozzle.
3. Close the hood.



## WINDSHIELD WASHER HOSES

### Removal Procedure

1. Open the hood.
2. Disconnect the windshield washer hose from the washer nozzles on the hood.
3. Remove the front left wheel. Refer to *Section 2E, Tires and Wheels*.
4. Remove the front wheel well splash shield. Refer to *Section 9A, Body Front End*.
5. Disconnect the washer hose from the washer reservoir.
6. Remove the washer hose.



### Installation Procedure

1. Connect the washer hose to the washer pump.
2. Install the front wheel well splash shield. Refer to *Section 5H, Body Front End*.
3. Install the front left wheel. Refer to *Section 2E, Tires and Wheels*.
4. Connect the windshield washer hose to the washer nozzles on the hood.
5. Close the hood.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### WINDSHIELD WIPER SYSTEM

The windshield wiper system consists of a wiper motor, a linkage, a wiper arm and a blade, and a wiper/washer switch. The windshield wiper circuit incorporates a self-parking device which consists of a worm gear and a cam plate in order to keep the circuit engaged temporarily when the switch is turned off. The wiper system is driven by a permanent magnet-type motor. The windshield wiper motor is mounted on the dash panel and is directly connected to the windshield wiper linkage.

The windshield wiper motor has two speeds, LO and HI, and also has intermittent wiper capability. The wiper

switch is an integral part of the wiper/washer switch. Windshield wiper operation is actuated through the lever on the right side of the steering column.

### WINDSHIELD WASHER SYSTEM

The windshield washer system is equipped with a washer fluid reservoir, a washer fluid pump, hoses, nozzles, and a wiper/washer switch. The windshield washer reservoir is mounted behind the front left wheel well splash shield. Attached to the reservoir is a washer pump, which pumps fluid through the hoses to the two nozzles mounted on the hood. The washer switch is an integral part of the wiper/washer switch. Windshield washer operation is actuated through the lever on the right side of the steering column.

## SECTION 9E

# INSTRUMENTATION/DRIVER INFORMATION

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

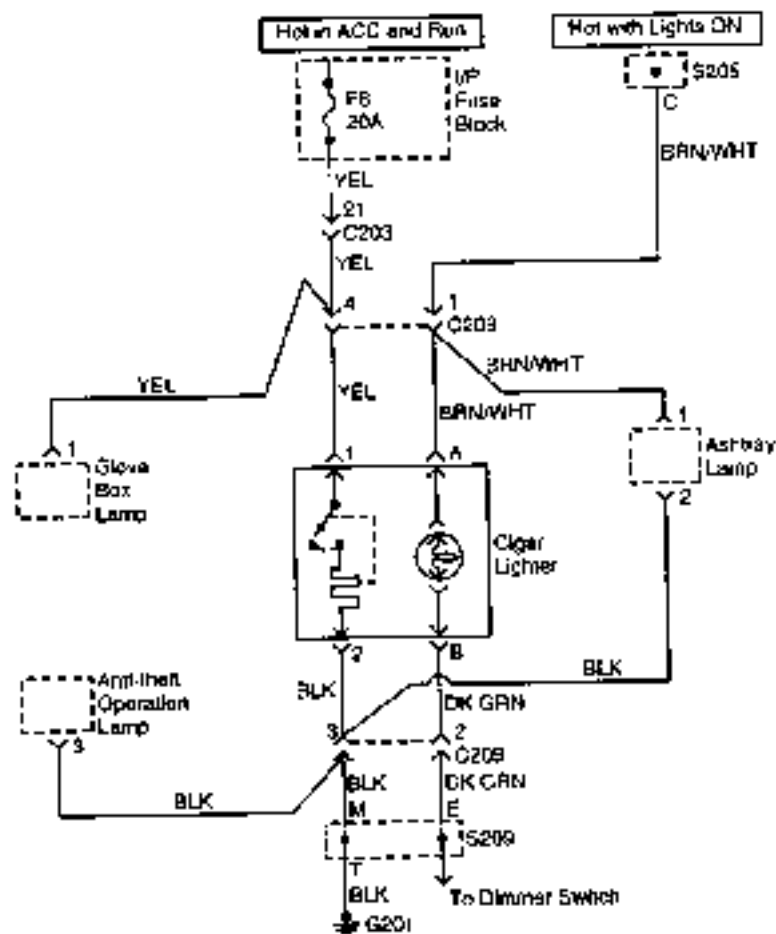
### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Ashtray Housing Screws	2.5	-	22
Chime Module Screws	4	-	35
Cluster Illumination Connector Screws	2	-	18
Digital Clock Screws	3	-	27
Fuel Gauge Screws	2	-	18
Glove Box Brace Bolts	10	-	89
Glove Box Housing Screws	2.5	-	22
Glove Box Screws	2.5	-	22
Hood Release Handle Screw	2.5	-	22
Instrument Cluster Screws	3	-	27
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Instrument Panel Side Trim Cover Screws	2.5	-	22
Instrument Panel Storage Compartment Screws	2.5	-	22
Instrument Panel Vent Screws	3	-	27
Instrument Panel-to-Body Bolts	22	16	-
Instrument Panel-to-Floor Bolts	22	16	-
Instrument Panel-to-Heater Air Distributor Case Screw	4	-	35
Passenger Side Knob Bolster Trim Panel Screws	3	-	27
Speedometer/Odometer Screws	2	-	18
Steering Column Bolts	22	16	-
Steering Column Nuts	22	16	-
Tachometer Screws	2	-	18
Temperature Gauge Screws	2	-	18

## INSTRUMENT CLUSTER INDICATOR LAMPS SPECIFICATIONS

Indicator Lamp	Color	Bulb
ABS Warning	Amber	14 v 1.4 W
Airbag Warning	Red	14 v 1.4 W
Automatic Transaxle Shift Position Indicators		
Park	Green	14 v 1.4 W
Reverse	Red	14 v 1.4 W
Neutral	Green	14 v 1.4 W
Drive	Green	14 v 1.4 W
3	Green	14 v 1.4 W
2	Green	14 v 1.4 W
1	Green	14 v 1.4 W
Battery Charge Indicator	Red	14 v 1.4 W
Check Engine Warning	Amber	14 v 1.4 W
Cruise Control Indicator	Green	14 v 1.4 W
Daytime Running Lamps	Amber	14 v 1.4 W
Door Open Warning	Red	14 v 1.4 W
Fasten Seat Belt Warning	Red	14 v 1.4 W
Front Fog Lamp Indicator	Green	14 v 1.4 W
High Beam Indicator	Blue	14 v 1.4 W
Low Fuel Level Warning	Amber	14 v 3 W
Luggage Compartment Open Warning	Amber	14 v 1.4 W
Oil Pressure Warning	Red	14 v 1.4 W
Parking Brake Indicator and Brake Fluid Warning	Red	14 v 1.4 W
Rear Fog Lamp Indicator	Amber	14 v 1.4 W
Service Engine Soon Warning	Amber	14 v 1.4 W
Traction Control System Warning	Amber	14 v 1.4 W
Transaxle Power Mode Indicator	Amber	14 v 1.4 W
Turn Signal Indicators	Green	14 v 1.1 W

# DIAGNOSIS



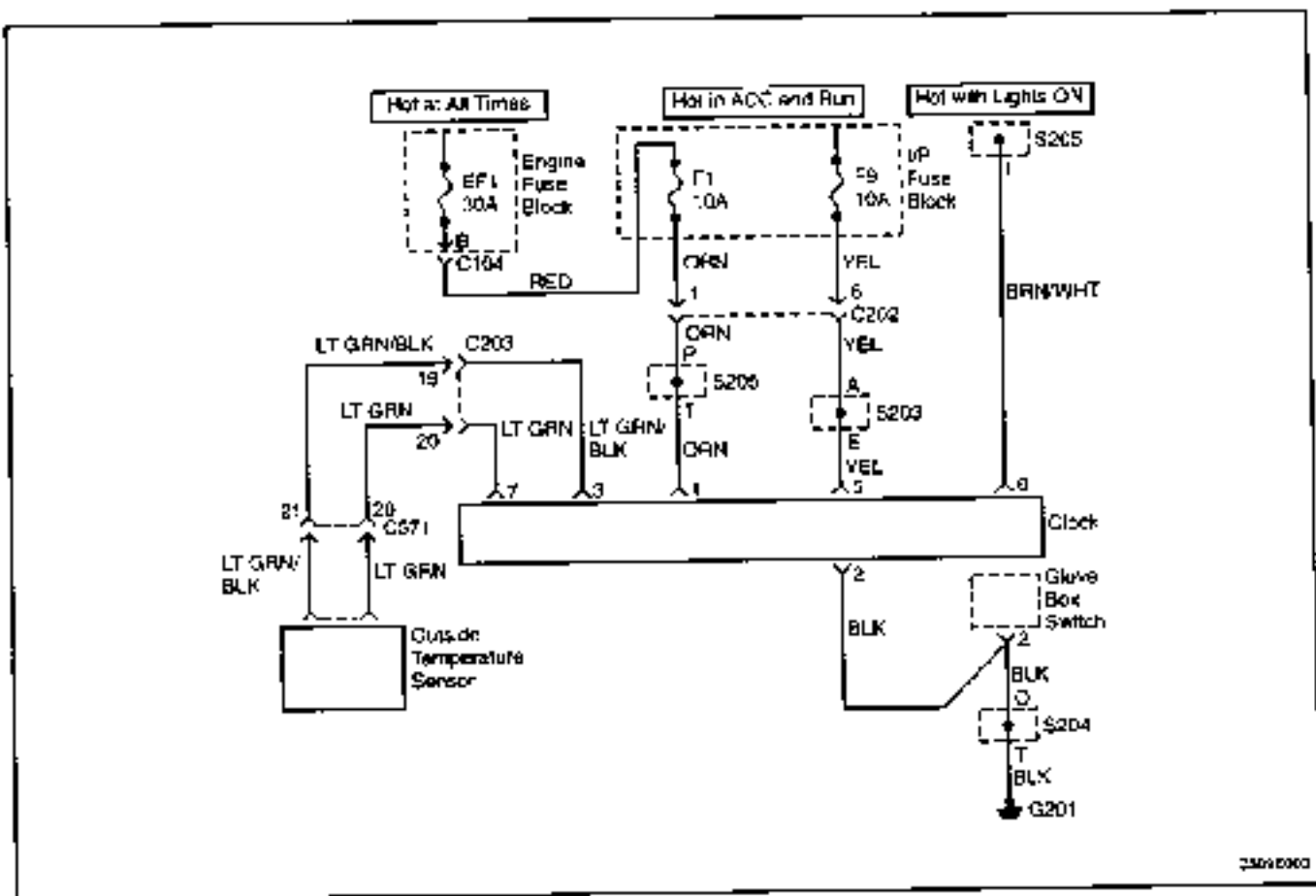
C200c010



**CIGAR LIGHTER****Cigar Lighter Inoperative**

Step	Action	Value(s)	Yes	No
1	Check fuse F8. Is the fuse blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
3	1. Turn the ignition key to the ACC position. 2. Use a voltmeter to check for voltage at fuse F8. Does the battery voltage available at the fuse F8 match the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power-supply circuit for fuse F8. Is the repair complete?	-	System OK	-
5	1. Remove the electrical connector from the back of the cigar lighter. 2. Turn the ignition key to the ACC position. 3. Use a voltmeter to check the voltage at the YEL wire. Does the battery voltage available at the YEL wire match the value specified?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the fuse F8 and the cigar lighter. Is the repair complete?	-	System OK	-
7	With the ignition key still in the ACC position, connect the voltmeter between the YEL and the BLK wires at the cigar lighter connector. Does the battery voltage match the value specified?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open ground circuit. Is the repair complete?	-	System OK	-
9	Replace the cigar lighter. Is the repair complete?	-	System OK	-

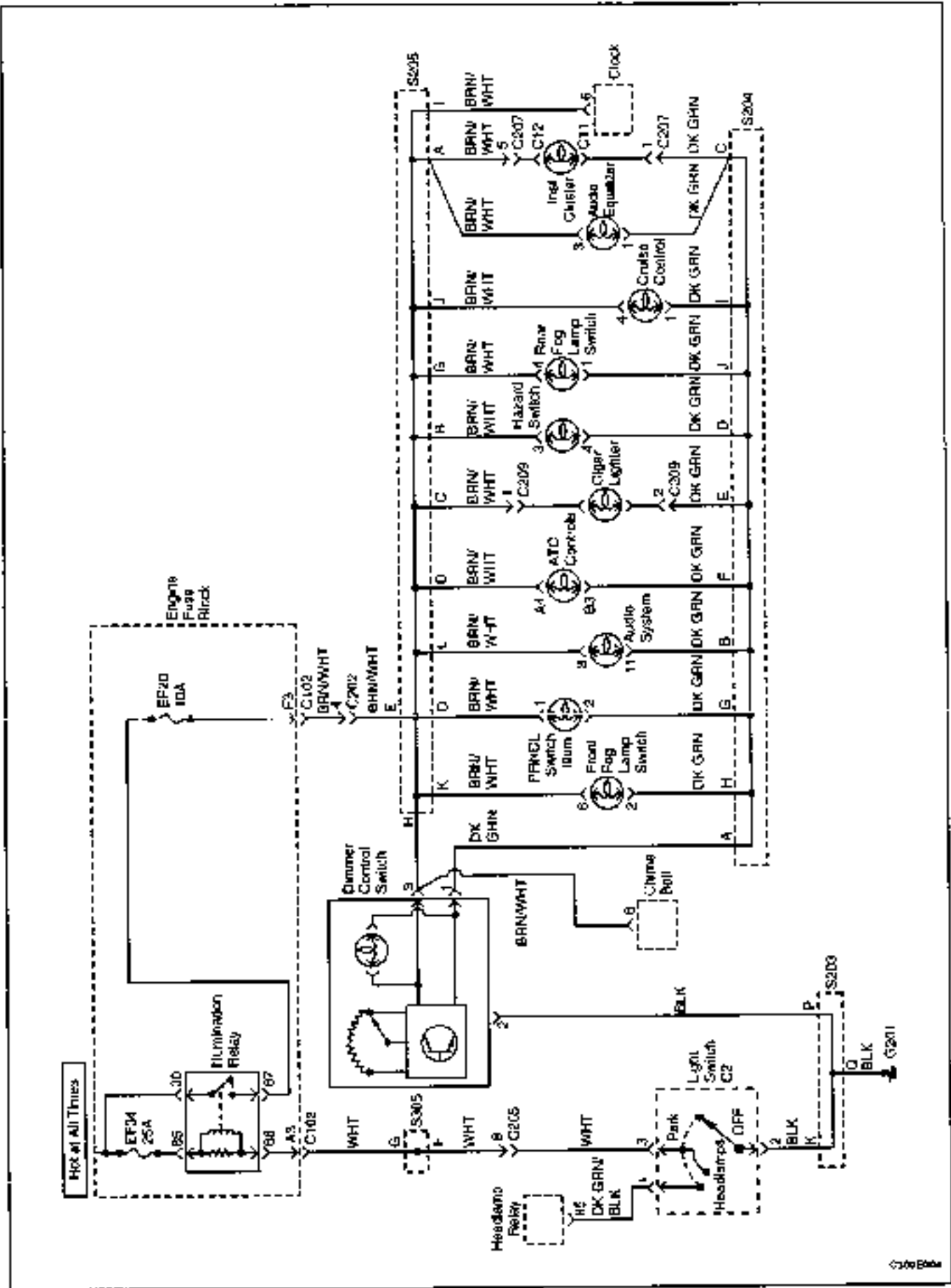
# 9E-6 INSTRUMENTATION/DRIVER INFORMATION



33040003

**DIGITAL CLOCK****Digital Clock Inoperative**

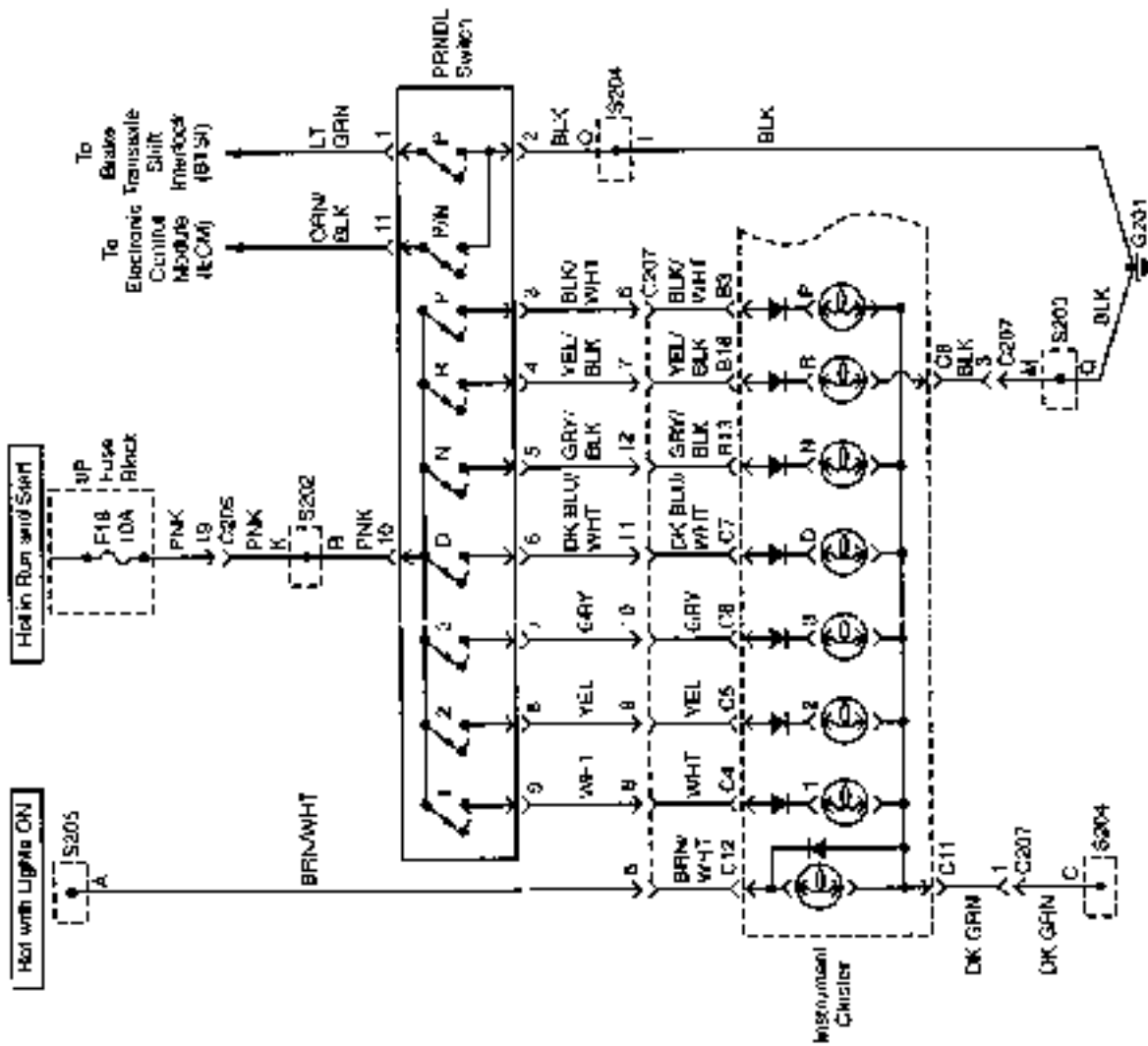
Step	Action	Value(s)	Yes	No
1	Is either of the fuses F1 or F9 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuses. Is the repair complete?	-	System OK	-
3	1. Turn the ignition ON. 2. Use a voltmeter to check battery voltage available at fuses F1 and F9. Does the voltmeter indicate the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit for the fuse. Is the repair complete?	-	System OK	-
5	1. Turn the ignition ON. 2. Use a voltmeter to check the battery voltage available at the clock connector terminal 5. Does the voltmeter indicate the value specified?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the clock connector terminal 5 and the fuse F9. Is the repair complete?	-	System OK	-
7	Turn the ignition ON. Is battery voltage available at the clock connector terminal 1?	-	Go to Step 9	Go to Step 8
8	Repair the open circuit between the clock connector terminal 1 and the fuse F1. Is the repair complete?	-	System OK	-
9	Check continuity between the clock connector terminal 2 and ground. Does the multimeter indicate the value specified?	<math>0 \Omega</math>	Go to Step 10	Go to Step 11
10	Replace the clock. Is the repair complete?	-	System OK	-
11	Repair the open ground circuit between the clock connector terminal 2 and the ground G201. Is the repair complete?	-	System OK	-



## INSTRUMENT PANEL ILLUMINATION

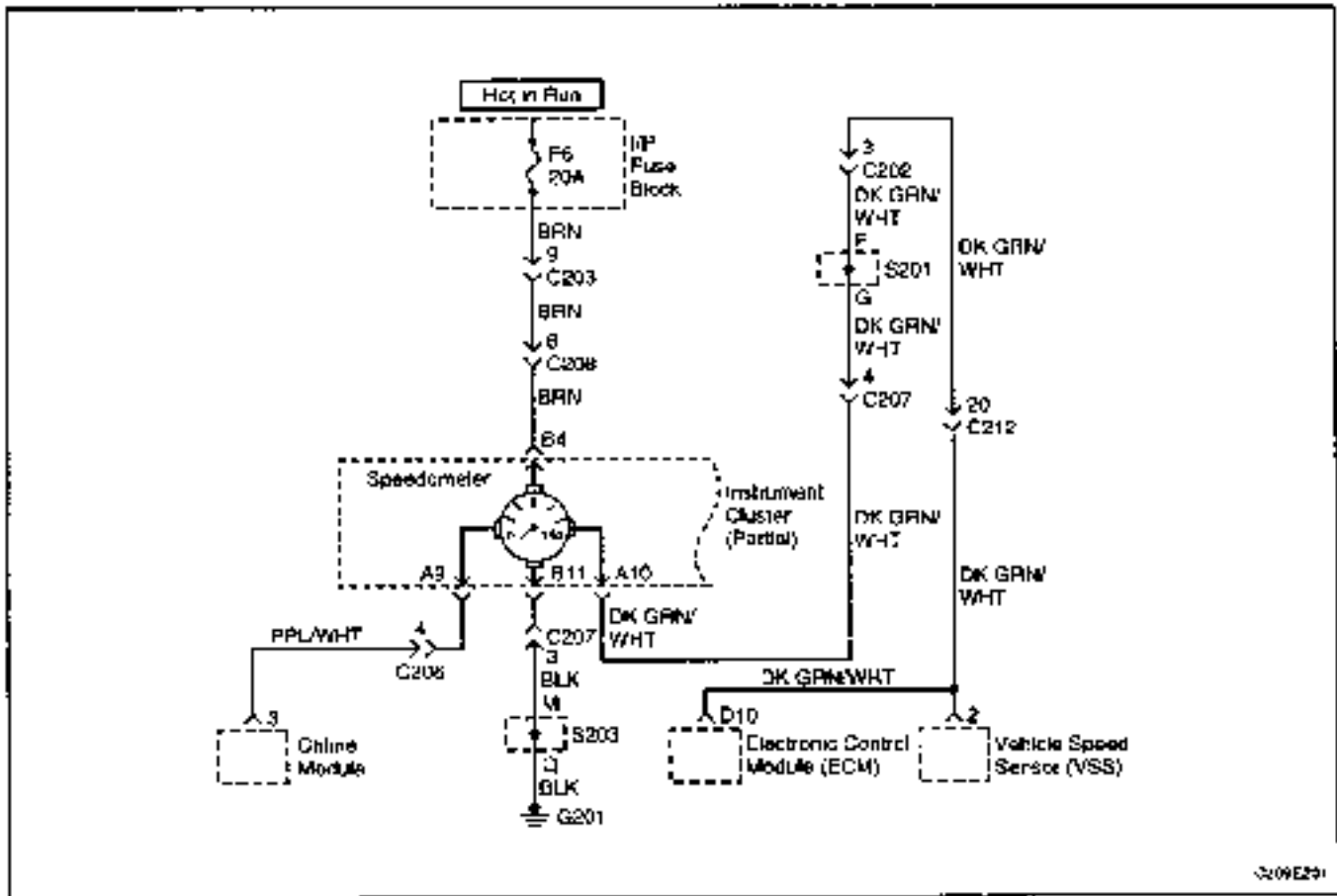
## Instrument Panel Does Not Illuminate When Lights Are ON

Step	Action	Value(s)	Yes	No
1	Check the operation of the headlamps and parking lamps. Do the headlamps and parking lamps work on both sides of the vehicle?	-	Go to Step 3	Go to Step 2
2	Repair the headlamps and the parking lamps before continuing with this diagnostic table. Does the instrument panel illumination turn ON after the headlamps and parking lamps have been repaired?	-	System OK	Go to Step 3
3	1. Disconnect the electrical connector at the dimmer control switch. 2. Turn the parking lamps ON. 3. Use a voltmeter to check the voltage at the dimmer control switch terminal 3. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open circuit between fuse EF20 and the dimmer control switch. Is the repair complete?	-	System OK	-
5	1. Turn the lights OFF. 2. At the disconnected dimmer control switch, use an ohmmeter to check the resistance between ground and terminal 2 of the dimmer switch connector. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 7	Go to Step 6
6	Repair the open circuit between ground and terminal 2 of the dimmer control switch connector. Is the repair complete?	-	System OK	-
7	1. Turn the parking lights ON. 2. At the disconnected dimmer control switch, check the voltage at terminal 1 of the dimmer control switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between connector C202 and terminal 1 of the dimmer control switch. Is the repair complete?	-	System OK	-
9	Replace the dimmer control switch. Is the repair complete?	-	System OK	-



### Automatic Transaxle Gear Position Illumination Lamp Inoperative, All Other Instrument Lamps OK

Step	Action	Value(s)	Yes	No
1	Is fuse F18 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?	-	System OK	-
3	1. Turn the ignition switch ON. 2. Use a voltmeter to check battery voltage available at fuse F18. Does the battery voltage match the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit to fuse F18. Is the repair complete?	-	System OK	-
5	1. Turn the ignition switch ON. 2. Remove the automatic transaxle position lamp. 3. Use a voltmeter to check battery voltage available at the lamp socket. Does the battery voltage match the value specified?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the automatic transaxle position lamp socket and fuse F18. Is the repair complete?	-	System OK	-
7	1. Remove the automatic transaxle position lamp. 2. Use an ohmmeter to check the resistance between the ground circuit and the lamp socket. Is the resistance equal to the value specified?	$\infty$ $\Omega$	Go to Step 9	Go to Step 8
8	Repair the open ground circuit between the automatic transaxle position lamp socket and ground G201. Is the repair complete?	-	System OK	-
9	Replace the automatic transaxle position lamp. Is the repair complete?	-	System OK	-



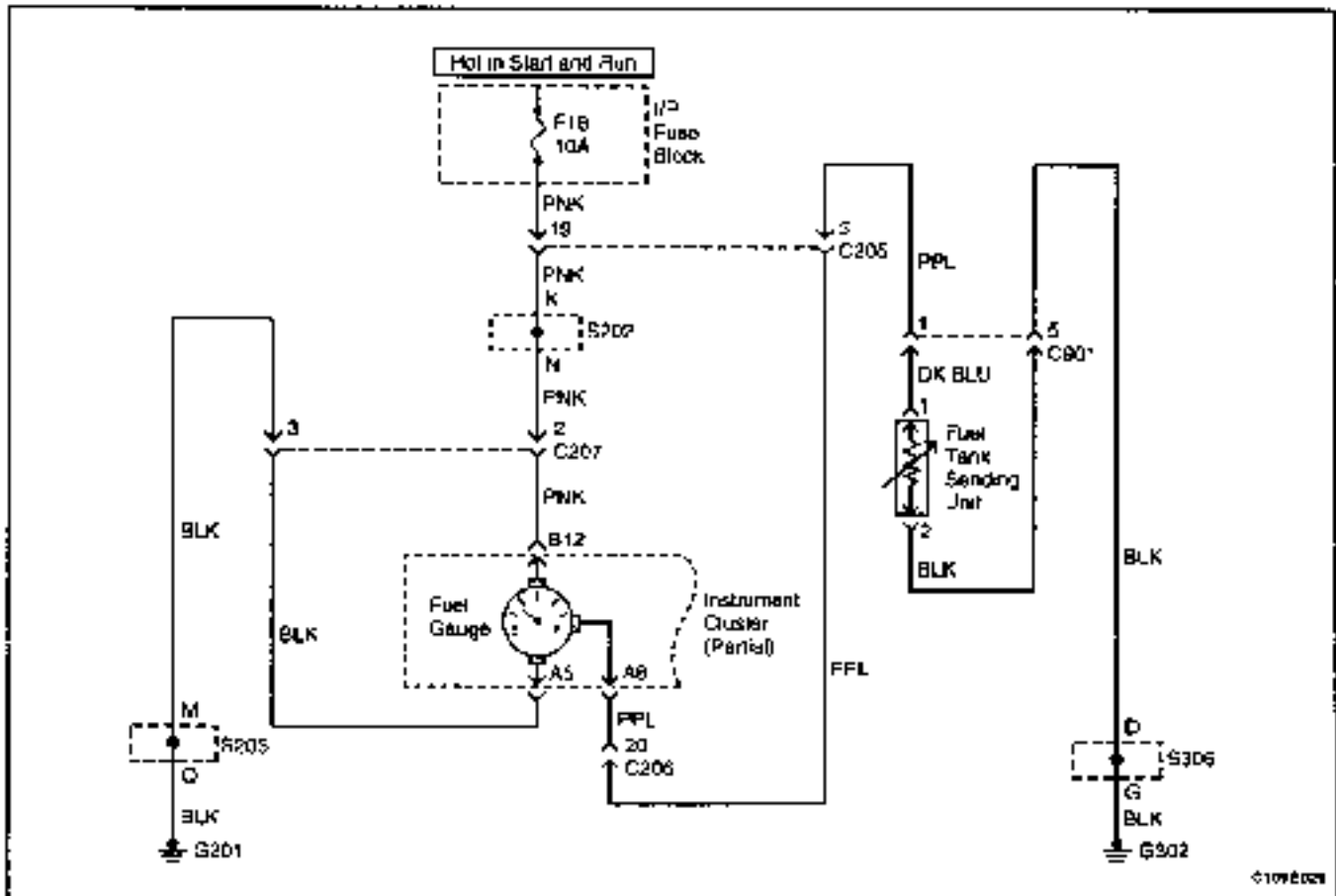
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**SPEEDOMETER****Speedometer Is Inoperative**

Step	Action	Value(s)	Yes	No
1	Check fuse F6. Is fuse F6 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace fuse F6. Is the repair complete?	-	System OK	-
3	1. Turn the ignition ON. 2. Check the voltage at fuse F6. Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply for the ignition 2 relay. Is the repair complete?	-	System OK	-
5	1. Connect a scan tool. 2. Check for engine control diagnostic trouble codes (DTCs). Is a vehicle speed sensor DTC set?	-	Go to Section 2F, Engine Controls	Go to Step 6
6	1. Remove the instrument cluster. 2. Turn the ignition ON. 3. Check the voltage at instrument cluster connector terminal B4. Is the voltage equal to the specified value?	11-14 v	Go to Step 8	Go to Step 7
7	Repair the open circuit between fuse F6 and the instrument cluster. Is the repair complete?	-	System OK	-
8	Use an ohmmeter to check the resistance between ground and instrument cluster connector terminal B11. Does the ohmmeter indicate the specified value?	$\infty \Omega$	Go to Step 10	Go to Step 9
9	Repair the open circuit between ground and instrument cluster connector terminal B11. Is the repair complete?	-	System OK	-
10	Use an ohmmeter to check continuity of the OK GRN/WHT wire between the vehicle speed sensor terminal 2 and instrument cluster connector terminal A10. Does the ohmmeter indicate the specified value?	$\infty \Omega$	Go to Step 12	Go to Step 11
11	Repair the open circuit between the vehicle speed sensor and the instrument cluster. Is the repair complete?	-	System OK	-
12	Replace the speedometer. Is the repair complete?	-	System OK	-

9E-14 INSTRUMENTATION/DRIVER INFORMATION



## FUEL GAUGE

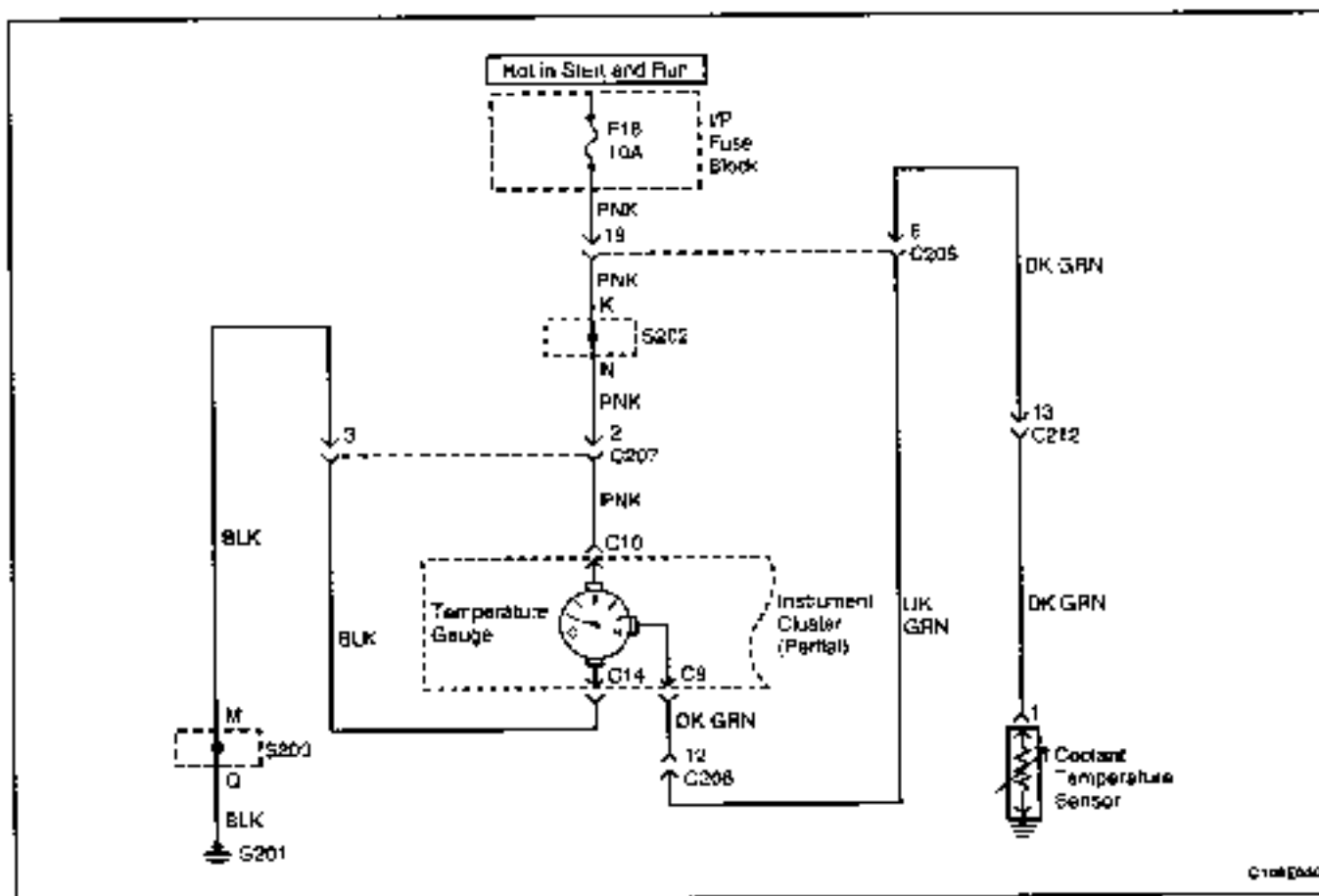
### Fuel Gauge Inoperative

#### Test Description

The number(s) below refer to step(s) on the diagnostic table.

1. Begin the diagnostic table at Step 1 if the problem is that the fuel gauge always indicates full. Begin the diagnostic table at Step 7 if the problem is that the fuel gauge always shows empty.

Step	Action	Value(s)	Yes	No
1	Turn the ignition ON. Does the fuel gauge always indicate a full fuel tank with the ignition ON?	-	Go to Step 2	Go to Step 7
2	Disconnect the fuel tank sending unit. Does the fuel gauge change to empty?	-	Go to Step 3	Go to Step 4
3	Replace the fuel tank sending unit. Is the repair complete?	-	System OK	-
4	Check the wiring harness for a short to ground between the fuel tank sending unit and the fuel gauge. Is there a short to ground?	-	Go to Step 5	Go to Step 6
5	Repair the short to ground. Is the repair complete?	-	System OK	-
6	Replace the fuel gauge. Is the repair complete?	-	System OK	-
7	1. Disconnect the fuel tank sending unit electrical connector. 2. Turn the ignition ON. 3. Check the voltage at the fuel tank sending unit connector C901 terminal 1. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between the fuel gauge and the fuel tank sending unit. Is the repair complete?	-	System OK	-
9	Check continuity between the fuel tank sending unit connector C901 terminal 5, and ground. Does the multimeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 11	Go to Step 10
10	Repair the open circuit or poor ground connection. Is the repair complete?	-	System OK	-
11	1. With the fuel tank sending unit electrical connector C901 disconnected, attach a jumper between ground and C901 terminal 1. 2. Turn the ignition ON. Does the fuel gauge move to full?	-	Go to Step 3	Go to Step 6



## TEMPERATURE GAUGE

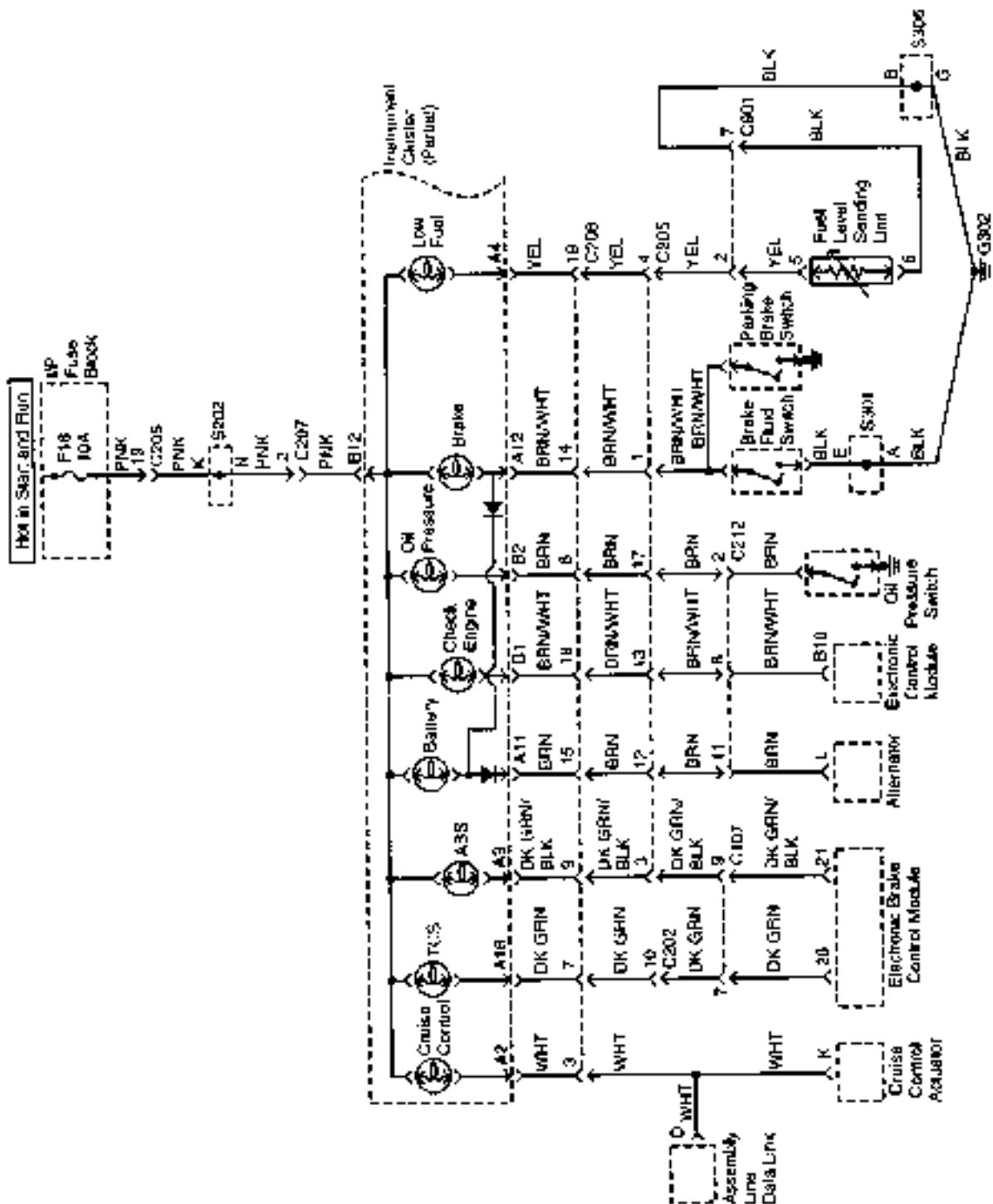
## Temperature Gauge Inoperative, Other Gauges OK

## Test Description

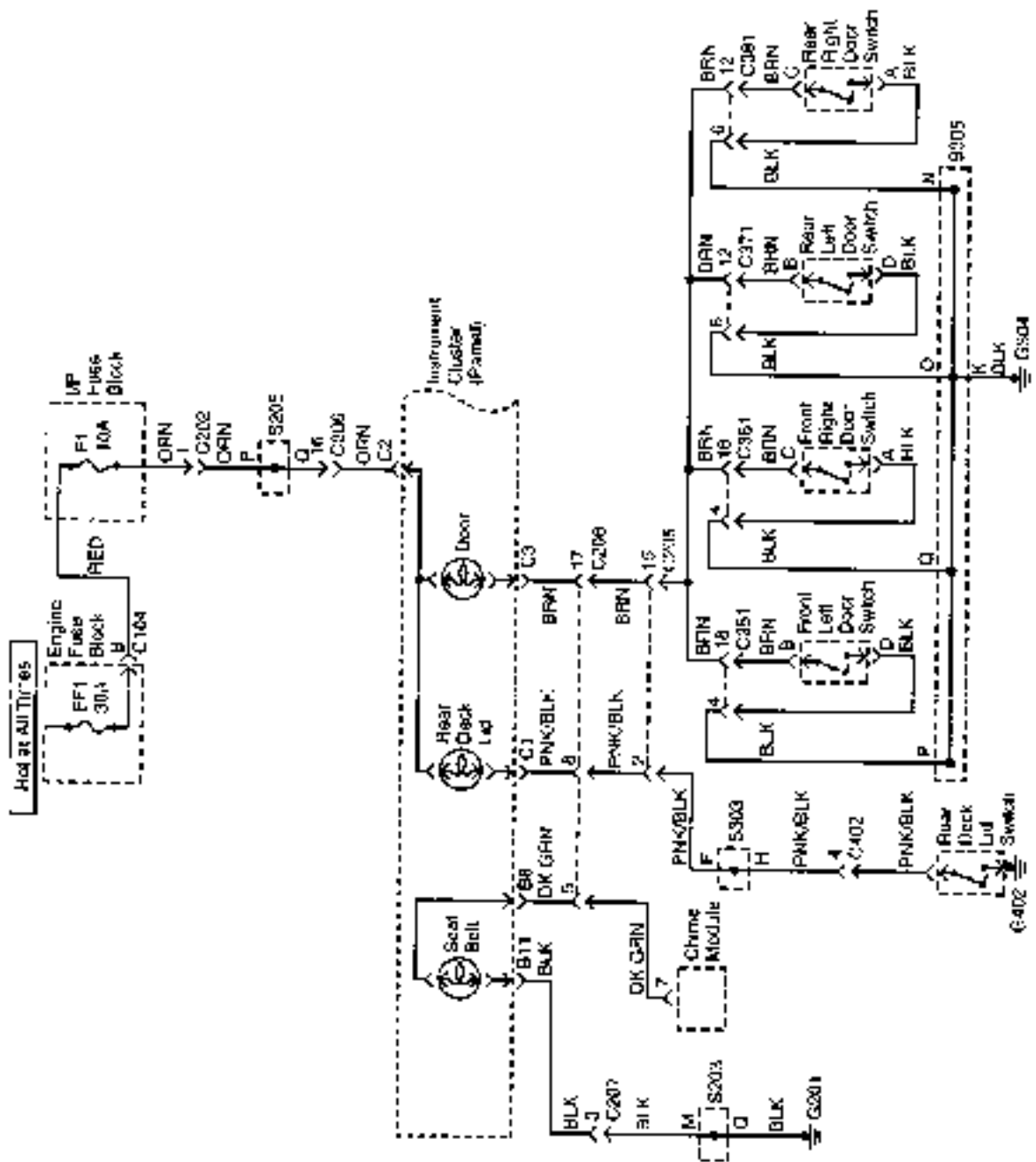
The number(s) below refer to step(s) on the diagnostic table.

1. Begin the diagnostic table at Step 1 if the problem is that the fuel gauge always indicates full. Begin the diagnostic table at Step 7 if the problem is that the fuel gauge always shows empty.

Step	Action	Value(s)	Yes	No
1	Allow the engine to cool to room temperature. With the ignition ON, does the temperature gauge always read at the high end of the scale?	-	Go to Step 7	Go to Step 2
2	Disconnect the coolant temperature sensor electrical connector. Does the temperature gauge indicator drop to the low end of the scale?	-	Go to Step 3	Go to Step 4
3	Replace the coolant temperature sensor. Is the repair complete?	-	System OK	-
4	Check for a short to ground between the coolant temperature sensor and the temperature gauge. Is there a short to ground?	-	Go to Step 5	Go to Step 6
5	Repair the short to ground. Is the repair complete?	-	System OK	-
6	Replace the temperature gauge. Is the repair complete?	-	System OK	-
7	1. Disconnect the coolant temperature sensor. 2. Turn the ignition ON. 3. Check the voltage at the coolant temperature sensor connector. Does the voltage equal the value specified?	11-14 v	Go to Step 10	Go to Step 8
8	Check for an open circuit between the coolant temperature sensor and the temperature gauge. Is there an open circuit?	-	Go to Step 9	Go to Step 6
9	Repair the open circuit between the coolant temperature sensor and the temperature gauge. Is the repair complete?	-	System OK	-
10	1. Disconnect the coolant temperature sensor. 2. Connect a jumper wire between the coolant temperature sensor connector and ground. 3. Turn the ignition ON. Does the temperature gauge move to the high end of the scale?	-	Go to Step 3	Go to Step 6



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Hold at All Times

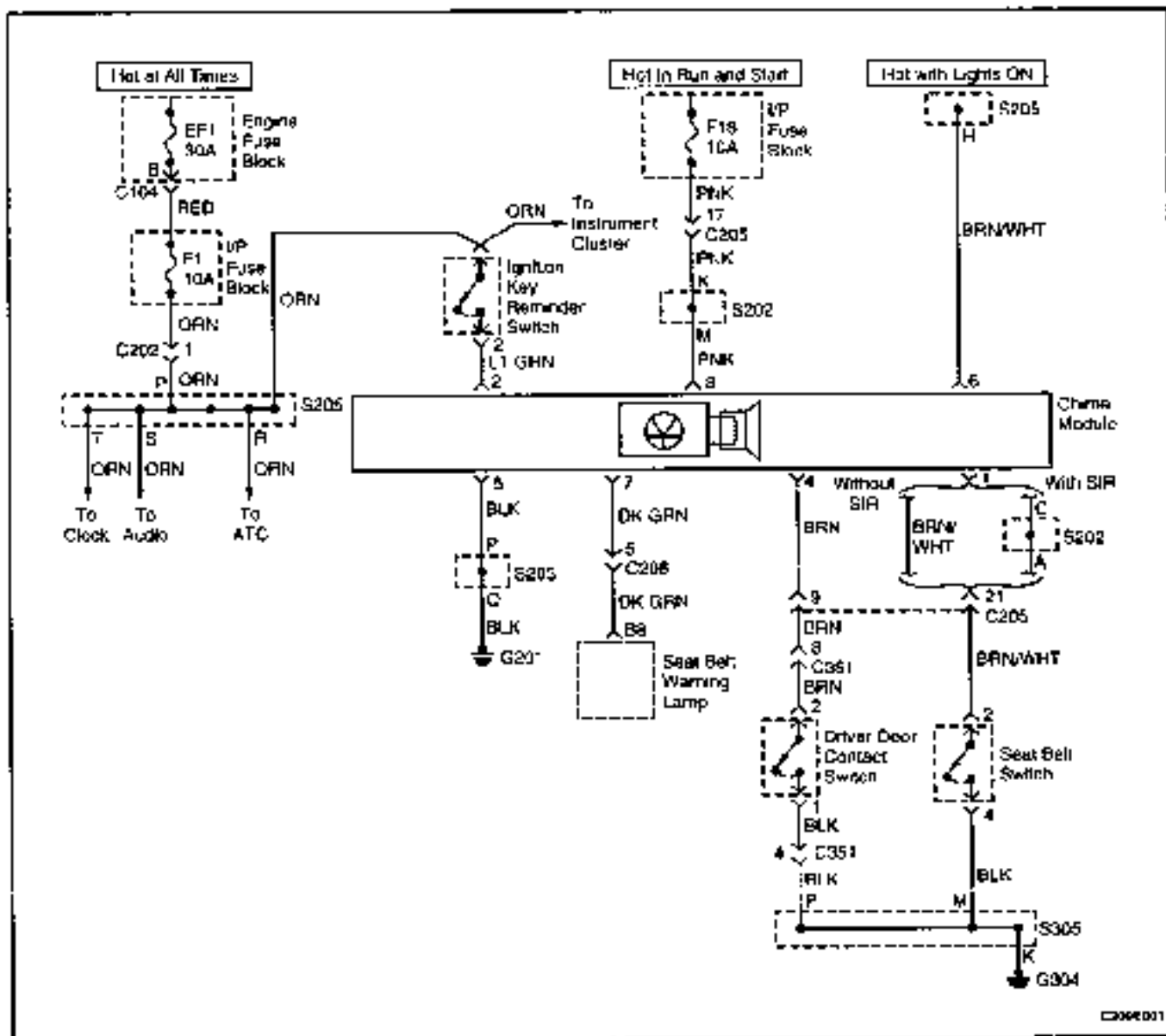
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**INSTRUMENT CLUSTER INDICATOR LAMPS****Instrument Cluster Indicator Lamps Do Not Operate**

Step	Action	Value(s)	Yes	No
1	Is fuse F1 or F18 blown?		Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?	-	System OK	-
3	1. Turn the ignition ON. 2. Check the voltage at fuse F1 and F18. Does the battery voltage match the value specified?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit to fuse F1 or F18. Is the repair complete?	-	System OK	-
5	1. Remove the instrument cluster. 2. Disconnect the instrument cluster connectors C2 and B12. 3. Turn the ignition ON. Does the battery voltage match the value specified?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between fuses F1 and F18 and the instrument cluster connectors C2 and B12. Is the repair complete?	-	System OK	-
7	Check the instrument cluster warning lamp bulbs. Are the bulbs OK?	-	Go to Step 9	Go to Step 8
8	1. Replace any warning lamp bulbs that were defective. 2. Check the charging system to make sure the alternator is not overcharging. 3. Repair the charging system if necessary. Is the repair complete?	-	System OK	-
9	Replace the instrument cluster. Is the repair complete?	-	System OK	-

9E-22 INSTRUMENTATION/DRIVER INFORMATION



036E011

**CHIME MODULE****No Chime With the Seat Belt Unfastened and the Key in the Ignition Switch****Diagnostic Aids**

For headlamps reminder chime diagnosis, refer to Section 9B, *Lighting Systems*.

**Test Description**

The number(s) below refer to step(s) on the diagnostic table.

- 7. The chime module is under the instrument panel on the left side.
- 10. The wires at the ignition switch may be RED and BLK, but they connect to ORN and LT GRN at the two-pin connector.

Step	Action	Value(s)	Yes	No
1	Check fuse F18 and F1 Is fuse F18 or F1 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?	-	System OK	-
3	Check the voltage at fuse F1 Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply for fuse F1 Is the repair complete?	-	System OK	-
5	1. Turn the ignition ON 2. Check the voltage at fuse F18 Is the voltage equal to the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the power supply for fuse F18 Is the repair complete?	-	System OK	-
7	1. Disconnect the chime module electrical connector. 2. Turn the ignition ON. 3. Check the voltage at terminal B of the chime module connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between fuse F18 and the chime module connector terminal B Is the repair complete?	-	System OK	-
9	1. Disconnect the chime module electrical connector. 2. Insert the key in the ignition switch. 3. Check the voltage at terminal 2 of the chime module connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 15	Go to Step 10
10	1. There are two wires from the key reminder switch which lead to an instrument harness connector with LT GRN and ORN wires. Disconnect that two-pin connector. 2. Check the voltage at the ORN wire. Is the voltage equal to the specified value?	11-14 v	Go to Step 12	Go to Step 11
11	Repair the open circuit between fuse F1 and the key reminder switch Is the repair complete?	-	System OK	-

## No Chime With the Seat Belt Unfastened and the Key in the Ignition Switch (Cont'd)

Step	Action	Value(s)	Yes	No
12	1. Insert a key into the ignition switch. 2. With the two-pin key reminder connector still disconnected, connect one ohmmeter lead to each wire leading to the key reminder switch. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 14	Go to Step 13
13	Replace the ignition switch. Is the repair complete?	-	System OK	-
14	Repair the open circuit between the connector for the key reminder switch and the chime module connector terminal 2. Is the repair complete?	-	System OK	-
15	Use an ohmmeter to check continuity between ground and terminal 5 of the chime module connector. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 17	Go to Step 16
16	Repair the open circuit between ground and terminal 5 of the chime module connector. Is the repair complete?	-	System OK	-
17	1. Unfasten the driver seat belt. 2. With the chime module electrical connector still disconnected, connect an ohmmeter between ground and terminal 1 of the chime module. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 18	Go to Step 19
18	Replace the chime module. Is the repair complete?	-	System OK	-
19	1. Disconnect the seat belt switch under the driver seat. 2. Connect one ohmmeter lead to each wire leading to the driver seat belt switch. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 21	Go to Step 20
20	Replace the seat belt switch. Is the repair complete?	-	System OK	-
21	Repair the open circuit between ground and terminal 1 of the chime module connector. Is the repair complete?	-	System OK	-

**No Chime With the Door Open and the Key in the Ignition Switch****Test Description**

The number(s) below refer to step(s) on the diagnostic table.

7. The chime module is under the instrument panel on the left side.

10. The wires at the ignition switch may be RED and BLK, but they connect to ORN and LT GRN at the two-pin connector.

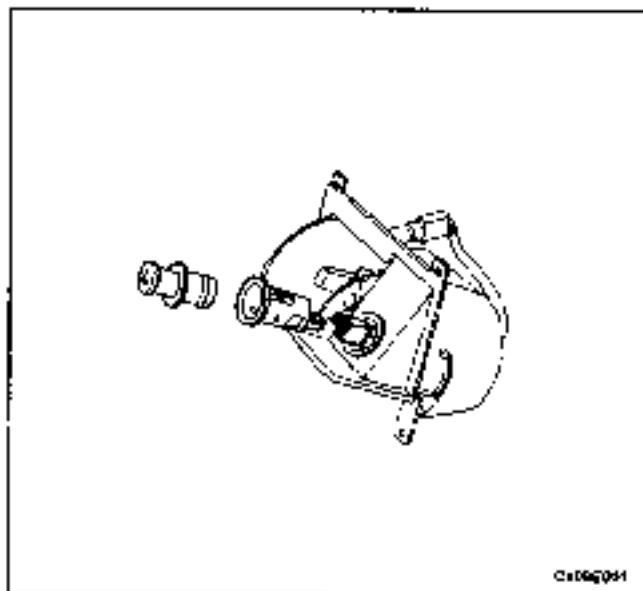
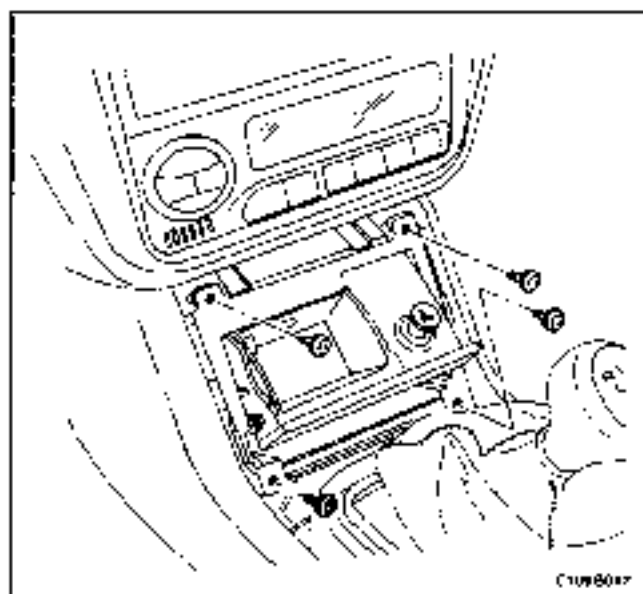
Step	Action	Value(s)	Yes	No
1	Check fuse F18 and F1. Is fuse F18 or F1 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?		System OK	-
3	Check the voltage at fuse F1. Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply for fuse F1. Is the repair complete?	-	System OK	-
5	1. Turn the ignition ON. 2. Check the voltage at fuse F18. Is the voltage equal to the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the power supply for fuse F18. Is the repair complete?	-	System OK	-
7	1. Disconnect the chime module electrical connector. 2. Turn the ignition ON. 3. Check the voltage at terminal B of the chime module connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 8	Go to Step 8
8	Repair the open circuit between fuse F18 and the chime module connector terminal B. Is the repair complete?	-	System OK	-
9	1. Disconnect the chime module electrical connector. 2. Insert the key in the ignition switch. 3. Check the voltage at terminal 2 of the chime module connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 15	Go to Step 10
10	1. There are two wires from the key reminder switch which lead to an instrument harness connector with LT GRN and ORN wires. Disconnect that two-pin connector. 2. Check the voltage at the ORN wire. Is the voltage equal to the specified value?	11-14 v	Go to Step 12	Go to Step 11
11	Repair the open circuit between fuse F1 and the key reminder switch. Is the repair complete?	-	System OK	-
12	1. Insert a key into the ignition switch. 2. With the two-pin key reminder connector still disconnected, connect one ohmmeter lead to each wire leading to the key reminder switch. Does the ohmmeter indicate the specified value?	∞ Ω	Go to Step 14	Go to Step 13
13	Replace the ignition switch. Is the repair complete?	-	System OK	-

## No Chime With the Door Open and the Key in the Ignition Switch (Cont'd)

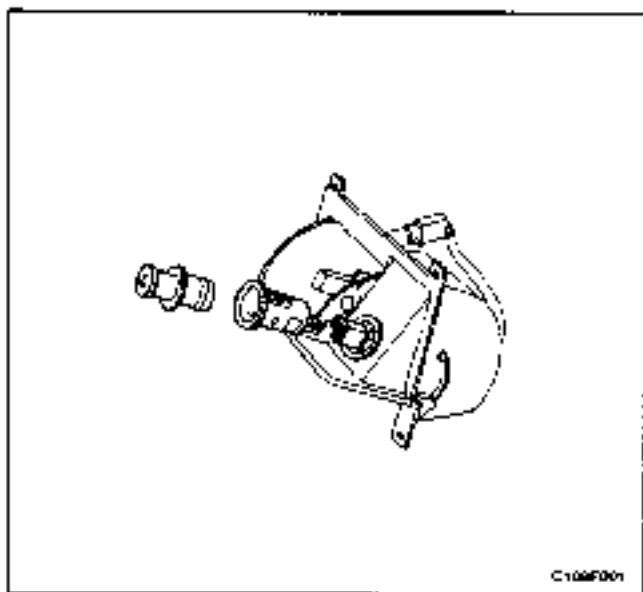
Step	Action	Value(s)	Yes	No
14	Repair the open circuit between the connector for the key reminder switch and the chime module connector terminal 2. Is the repair complete?	-	System OK	-
15	Use an ohmmeter to check continuity between ground and terminal 5 of the chime module connector. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 17	Go to Step 16
16	Repair the open circuit between ground and terminal 5 of the chime module connector. Is the repair complete?	-	System OK	-
17	1. Open the driver door. 2. With the chime module electrical connector still disconnected, connect an ohmmeter between ground and terminal 4 of the chime module. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 18	Go to Step 19
18	Replace the chime module. Is the repair complete?	-	System OK	-
19	Repair the open circuit between ground and terminal 4 of the chime module connector. (The driver door contact switch should be closed when the driver door is open.) Is the repair complete?	-	System OK	-

**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****CIGAR LIGHTER****Removal Procedure**

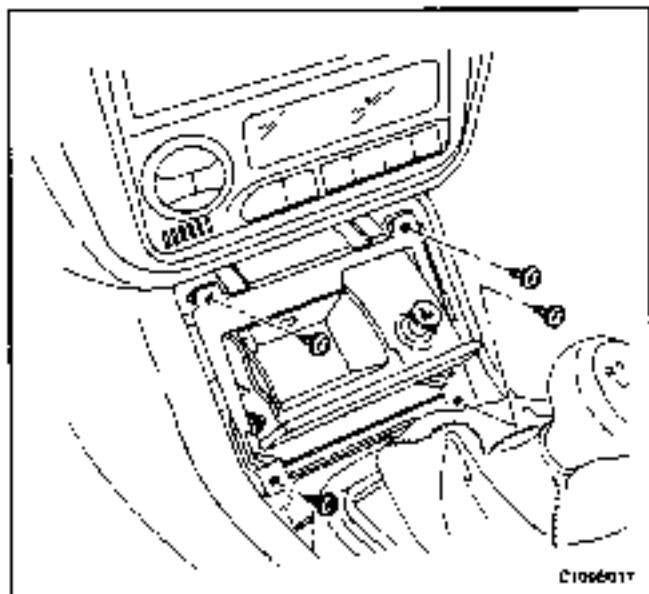
1. Disconnect the negative battery cable
2. Remove the shift lever trim panel
3. Remove the screws and the ashtray housing.



4. Disconnect the ashtray housing electrical connector.
5. Disconnect the cigar lighter electrical connector.
6. Remove the cigar lighter from the cigar lighter housing.
7. Remove the cigar lighter housing from the ashtray housing.

**Installation Procedure**

1. Install the cigar lighter housing in the ashtray housing.
2. Install the cigar lighter in the cigar lighter housing.
3. Connect the cigar lighter electrical connector

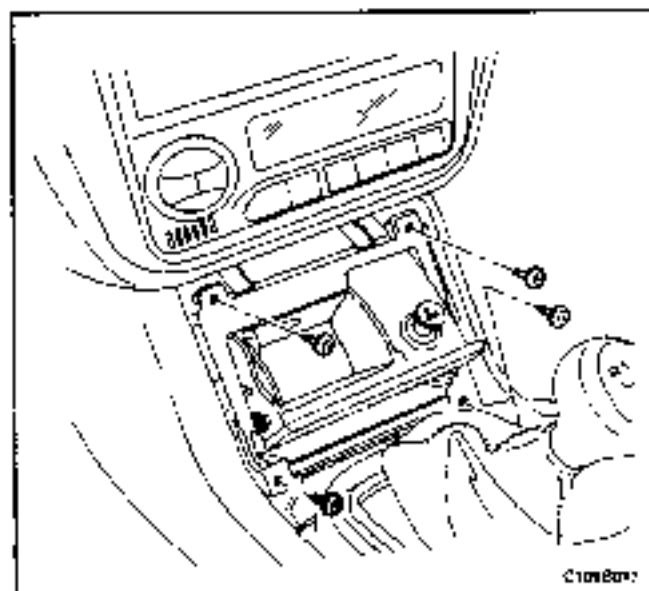


4. Connect the ashtray housing electrical connector.
5. Install the ashtray housing with the screws.

#### **Tighten**

Tighten the ashtray housing screws to 2.5 N•m (22 lb-in).

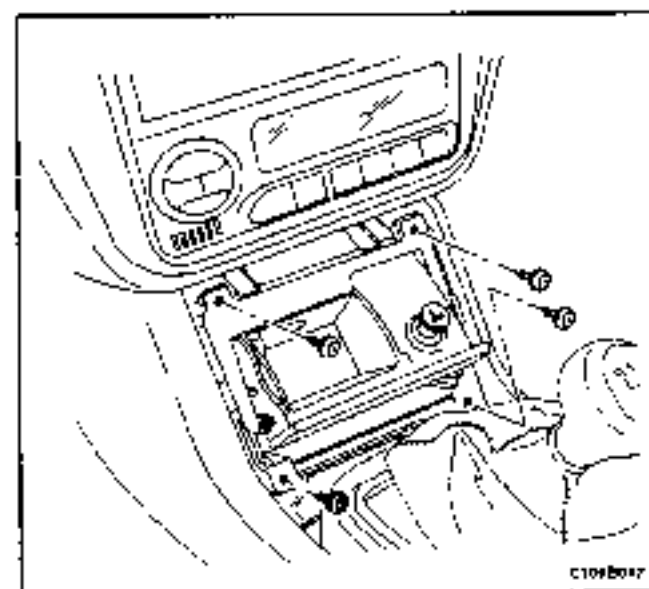
6. Install the shift lever trim panel.
7. Connect the negative battery cable.



## **ASHTRAY**

### **Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the shift lever trim panel.
3. Remove the screws and the ashtray housing.
4. Disconnect the ashtray electrical connector.
5. Remove the cigar lighter. Refer to "Cigar Lighter" in this section.
6. Remove the ashtray lamp. Refer to Section 9B, *Lighting Systems*.



### **Installation Procedure**

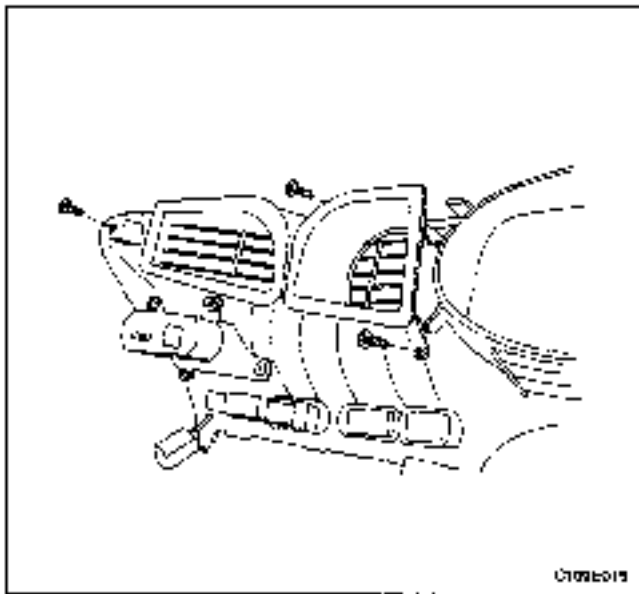
1. Install the ashtray lamp. Refer to Section 9B, *Lighting Systems*.
2. Install the cigar lighter. Refer to "Cigar Lighter" in this section.
3. Connect the ashtray electrical connector.
4. Install the screws and the ashtray housing.

#### **Tighten**

Tighten the ashtray housing screws to 2.5 N•m (22 lb-in).

5. Install the shift lever trim panel.
6. Connect the negative battery cable.

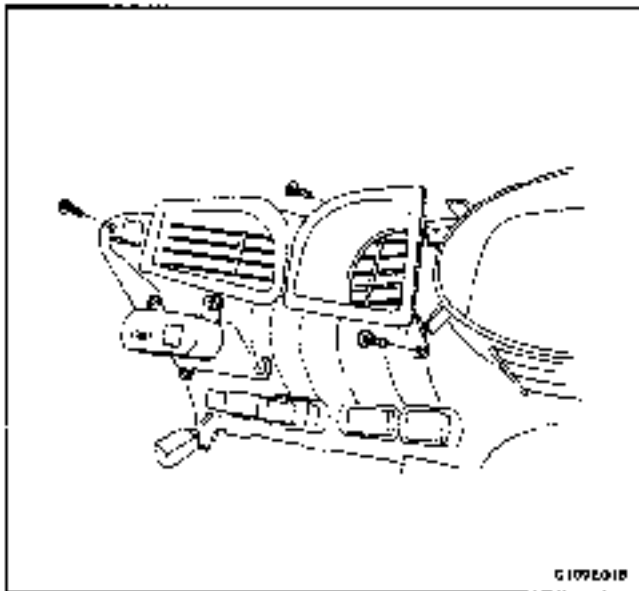




## INSTRUMENT PANEL VENTS

### Removal Procedure

1. Remove the instrument cluster trim panel. Refer to 'Instrument Cluster Trim Panel' in this section.
2. Remove the screws and the vents.



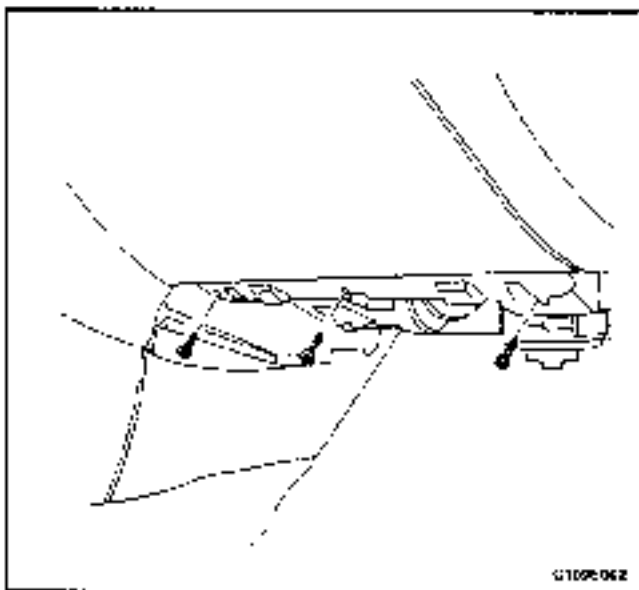
### Installation

1. Install the vents with the screws.

#### Tighten

Tighten the vent screws to 3 N•m (27 lb-in).

2. Install the instrument cluster trim panel. Refer to 'Instrument Cluster Trim Panel' in this section.

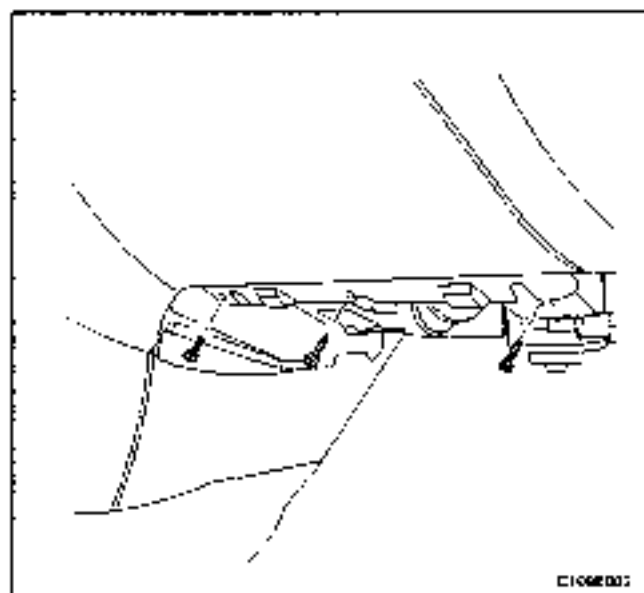


## GLOVE BOX

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Remove the footwell upper cover.
2. Remove the screws at the base of the glove box.
3. Open and remove the glove box.



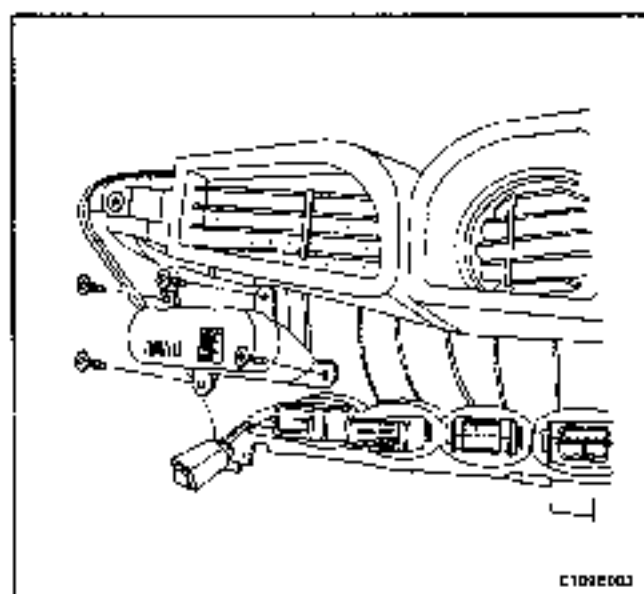
### Installation Procedure

1. Position the glove box in the instrument panel.
2. Install the glove box with the screws.

### Tighten

Tighten the glove box screws to 2.5 N·m (22 lb-in).

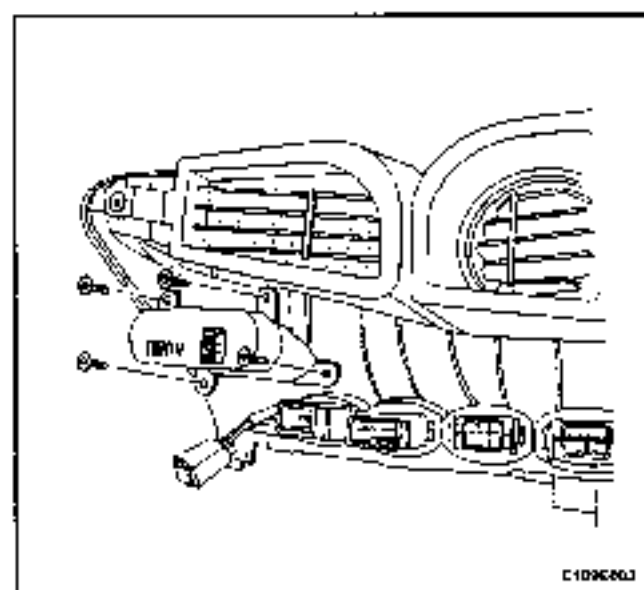
3. Install the footwell upper cover.



### DIGITAL CLOCK

#### Removal Procedure

1. Remove the instrument cluster trim panel. Refer to "Instrument Cluster Trim Panel" in this section.
2. Remove the screws and the digital clock.



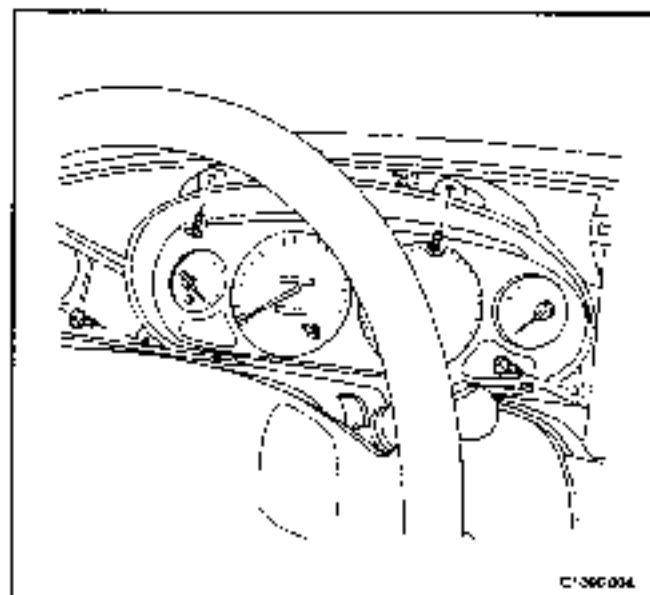
#### Installation Procedure

1. Install the digital clock with the screws.

### Tighten

Tighten the digital clock screws to 3 N·m (27 lb-in).

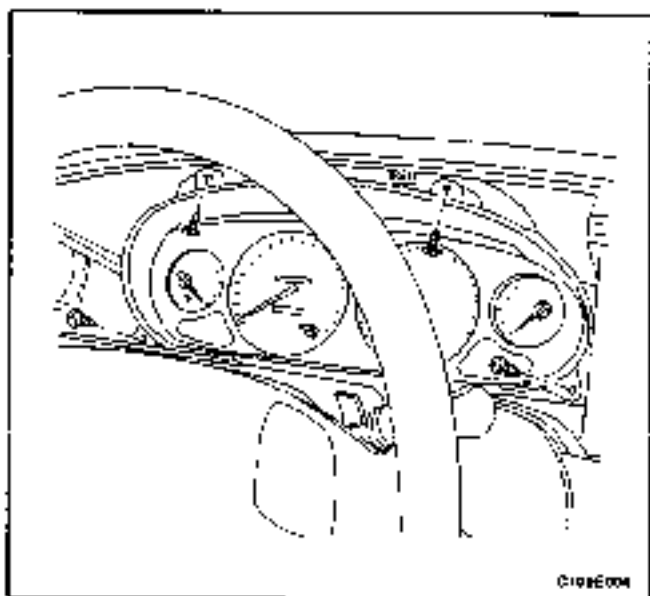
2. Install the instrument cluster trim panel. Refer to "Instrument Cluster Trim Panel" in this section.



## INSTRUMENT CLUSTER

### Removal Procedure

1. Remove the instrument cluster trim panel. Refer to "Instrument Cluster Trim Panel" in this section.
2. Remove the screws and the instrument cluster.



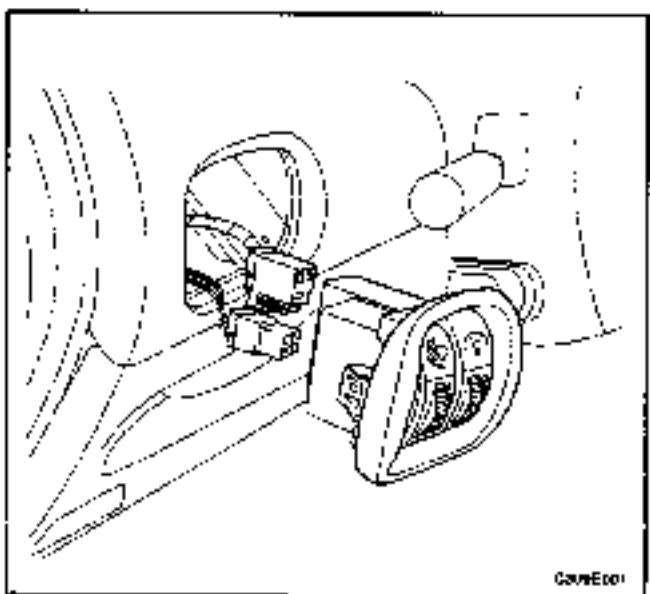
### Installation Procedure

1. Install the instrument cluster with the screws.

#### Tighten

Tighten the instrument cluster screws to 3 Nm (27 lb-in).

2. Install the instrument cluster trim panel. Refer to "Instrument Cluster Trim Panel" in this section.

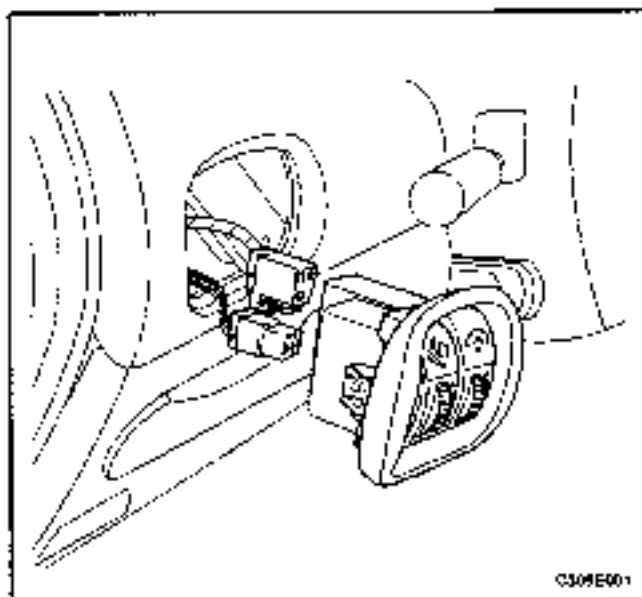


## INSTRUMENT CLUSTER DIMMER/HEADLAMP LEVELING SWITCH

(Left-Hand Drive Shown, Right-Hand Drive Similar)

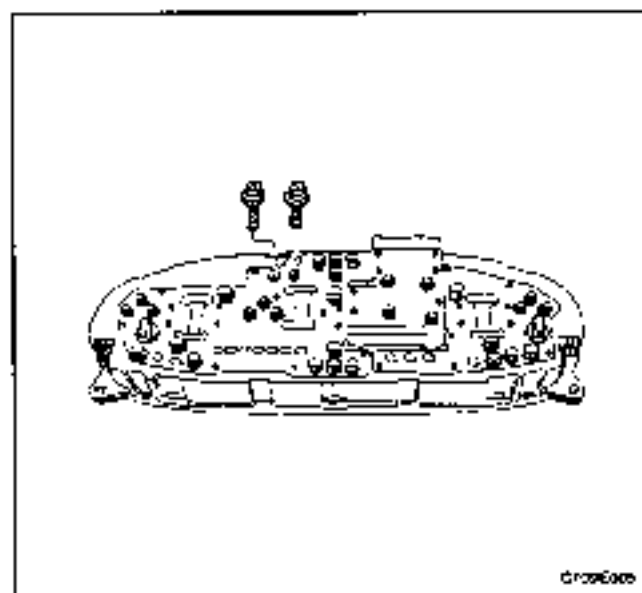
### Removal Procedure

1. Remove the instrument cluster dimmer/headlamp leveling switch assembly.
2. Disconnect the electrical connectors.



### Installation Procedure

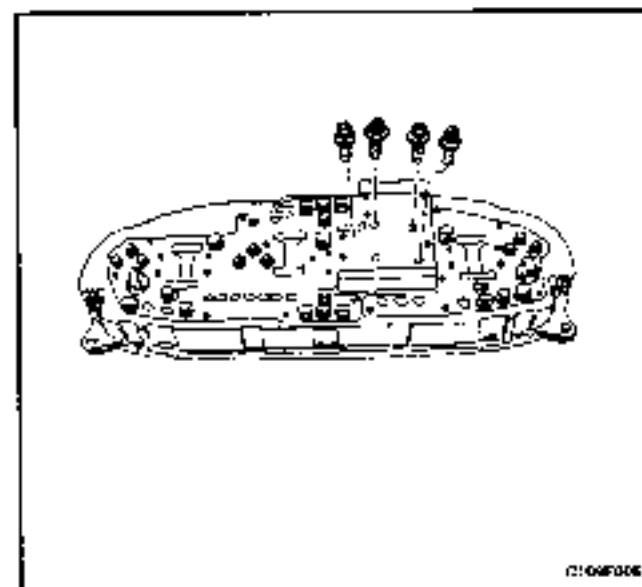
1. Replace the appropriate switch
2. Connect the electrical connectors.
3. Install the instrument cluster dimmer/headlamp leveling switch assembly



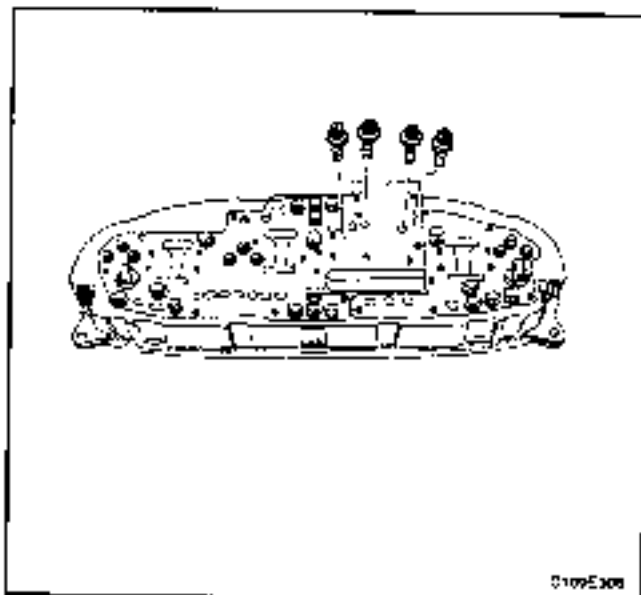
### SPEEDOMETER/ODOMETER/TRIP ODOMETER

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Remove the cluster illumination connector screws.



4. Press the clips down and remove the instrument cluster lens.
5. Remove the screws and the speedometer/odometer from the instrument cluster.

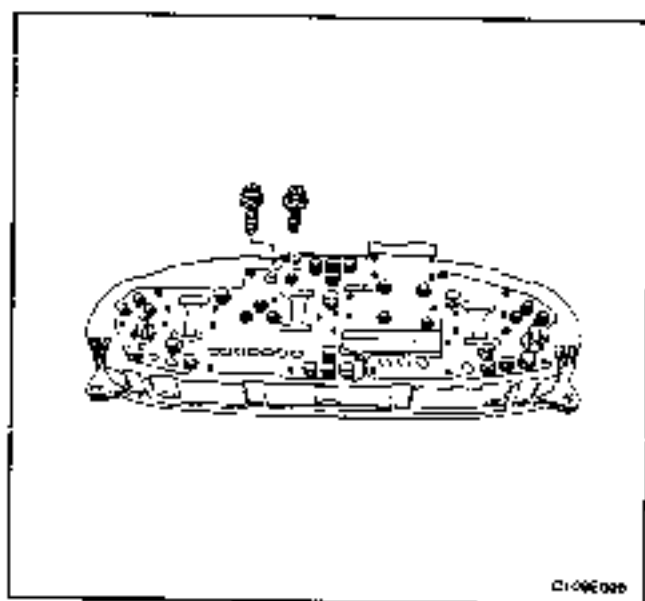


### Installation Procedure

1. Install the speedometer/odometer with the screws.

#### Tighten

Tighten the speedometer/odometer screws to 2 N·m (18 lb-in).

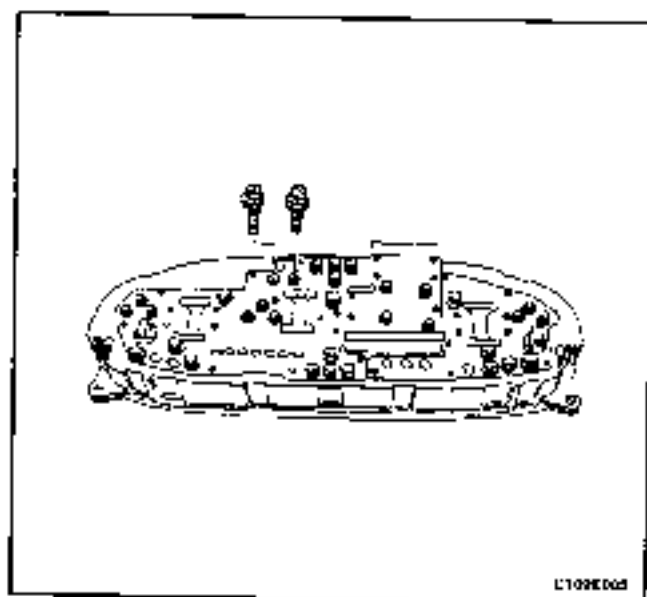


3. Install the instrument cluster lens.
4. Install the cluster illumination connector screws.

#### Tighten

Tighten the cluster illumination connector screws to 2 N·m (18 lb-in).

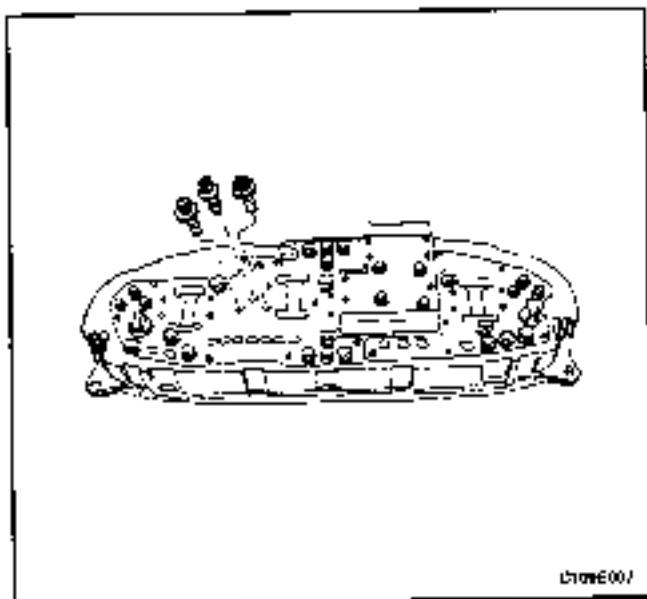
5. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
6. Connect the negative battery cable.



## TACHOMETER

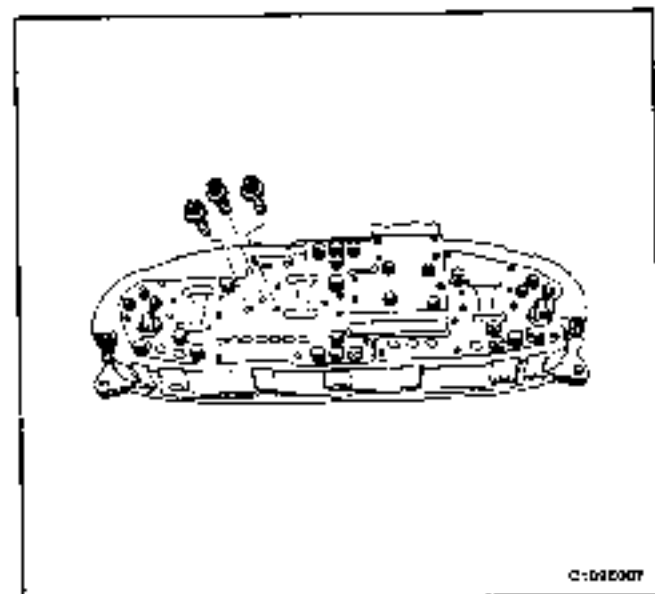
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Remove the cluster illumination connector screws.



C109E007

4. Press the clips down and remove the instrument cluster lens.
5. Remove the screws and the tachometer from the instrument cluster.



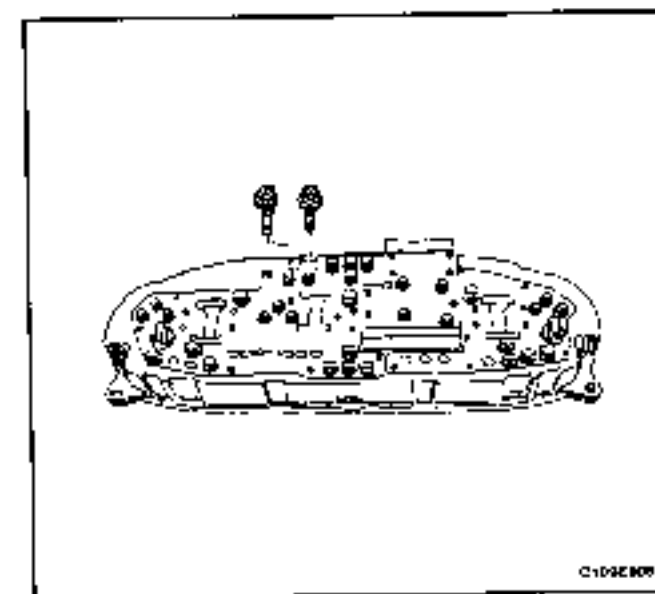
C109E007

### Installation Procedure

1. Install the tachometer to the instrument cluster with the screws.

#### Tighten

Tighten the tachometer screws to 2 N•m (18 lb-in).



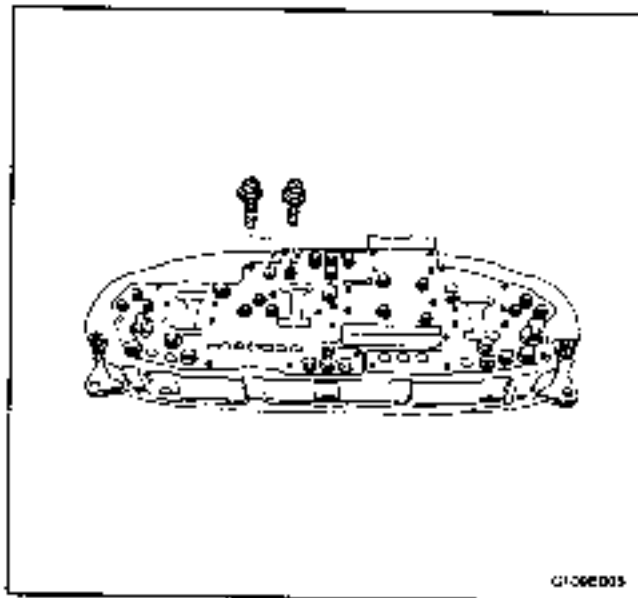
C109E009

2. Install the instrument cluster lens with the screws.
3. Install the cluster illumination connector screws.

#### Tighten

Tighten the cluster illumination connector screws to 2 N•m (18 lb-in).

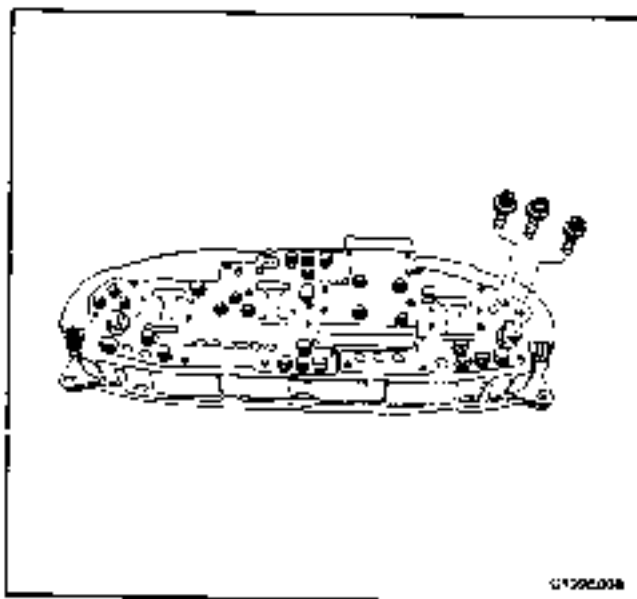
4. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
5. Connect the negative battery cable.



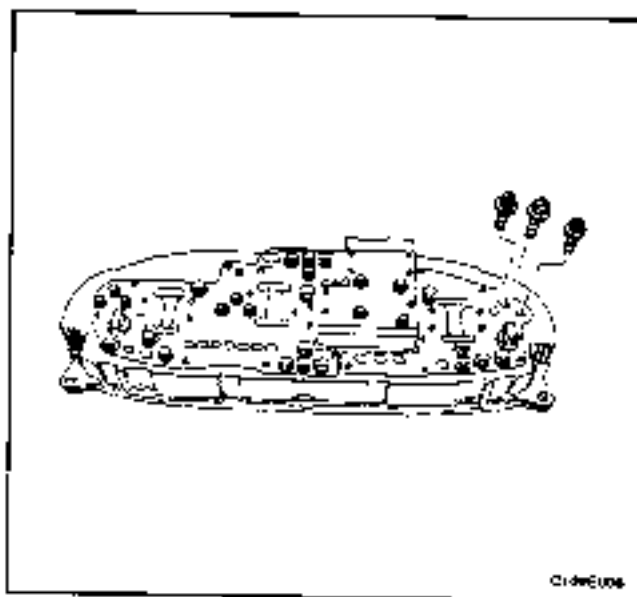
## FUEL GAUGE

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Remove the cluster illumination connector screws.
4. Press the clips down and remove the instrument cluster lens.



5. Remove the fuel gauge screws and the fuel gauge from the cluster assembly.

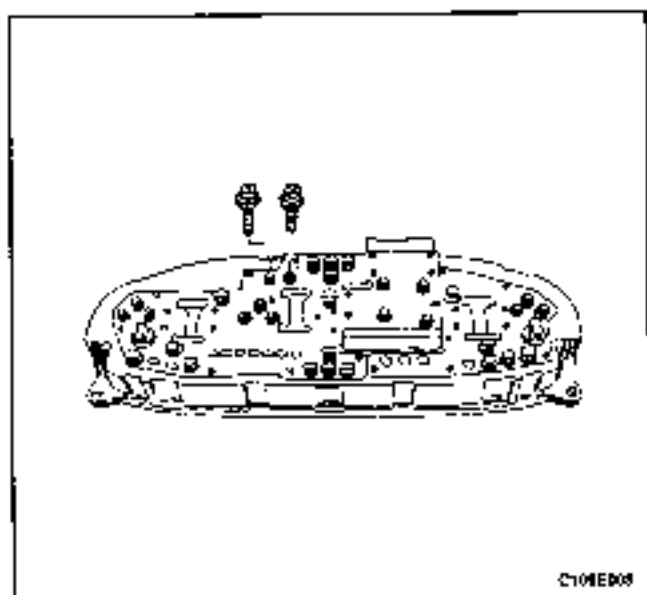


### Installation Procedure

1. Install the fuel gauge to the cluster assembly with the screws.

### Tighten

Tighten the fuel gauge screws to 2 N•m (18 lb-in).

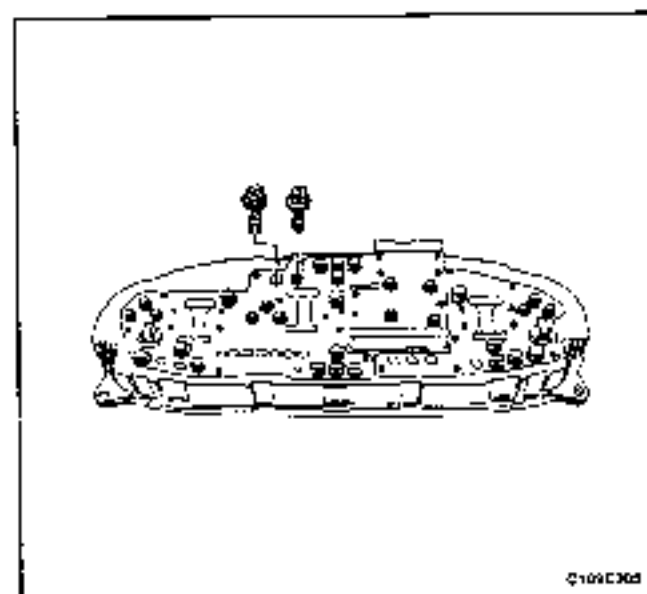


2. Install the instrument cluster lens with the instrument cluster lens screws.
3. Install the cluster illumination connector screws.

#### Tighten

Tighten the cluster illumination connector screws to 2 N·m (18 lb-in).

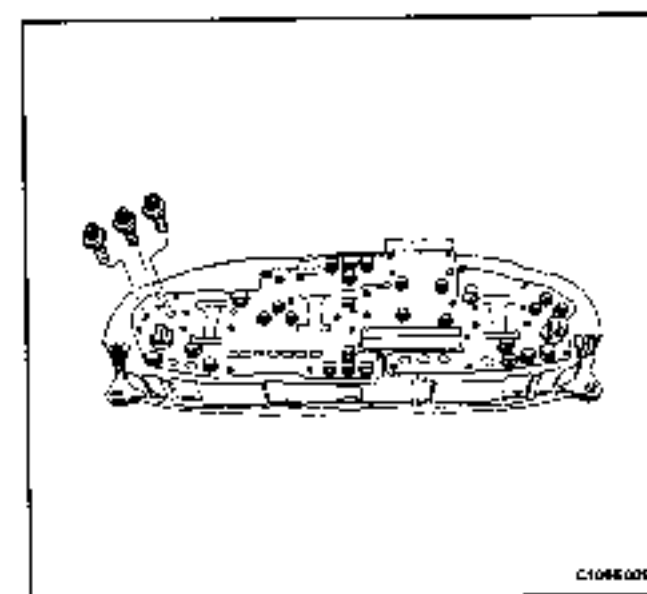
4. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
5. Connect the negative battery cable.



## TEMPERATURE GAUGE

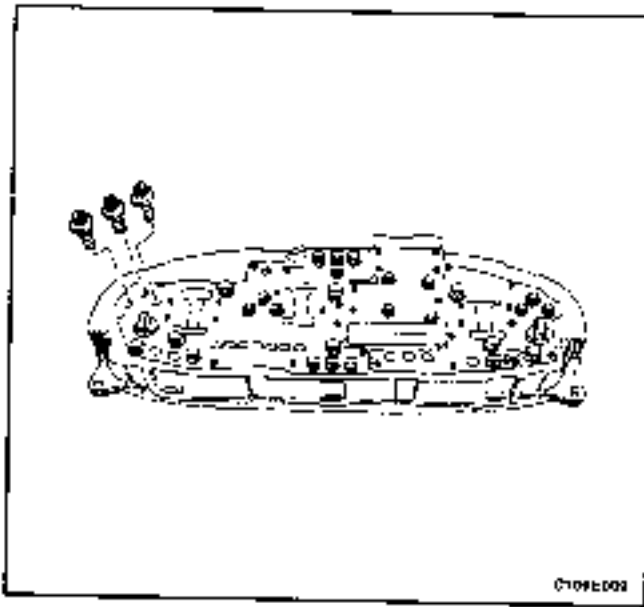
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Remove the cluster illumination connector screws.
4. Press the clips down and remove the instrument cluster lens.



4. Remove the screws and the temperature gauge from the cluster assembly.



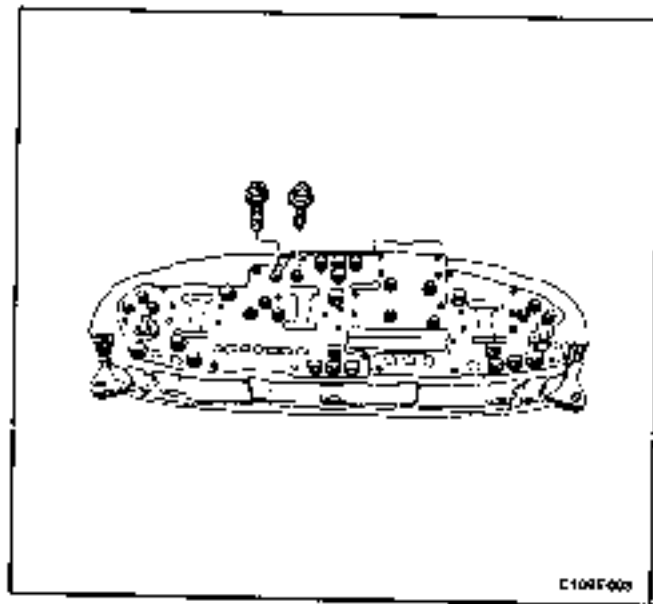


**Installation Procedure**

1. Install the temperature gauge to the cluster assembly with the screws.

**Tighten**

Tighten the temperature gauge screws to 2 N•m (18 lb-in).

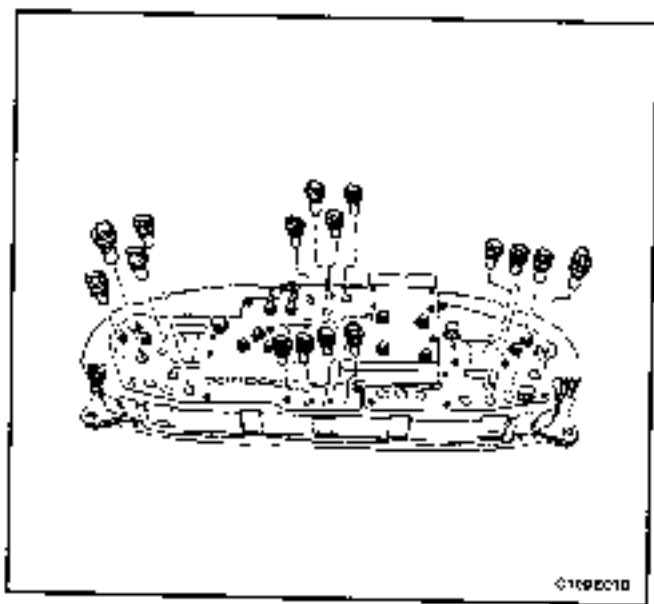


2. Install the instrument cluster lens.
3. Install the cluster illumination connector screws.

**Tighten**

Tighten the cluster illumination connector screws to 2 N•m (18 lb-in).

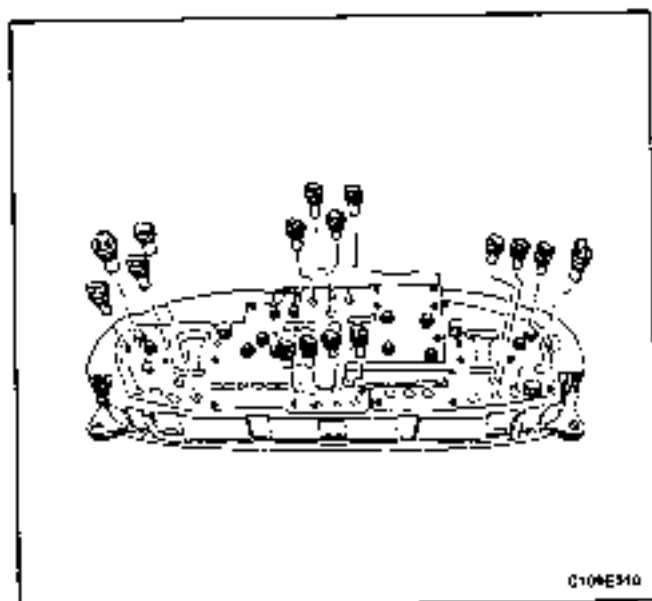
4. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
5. Connect the negative battery cable.



**INSTRUMENT CLUSTER INDICATOR LAMPS**

**Removal Procedure**

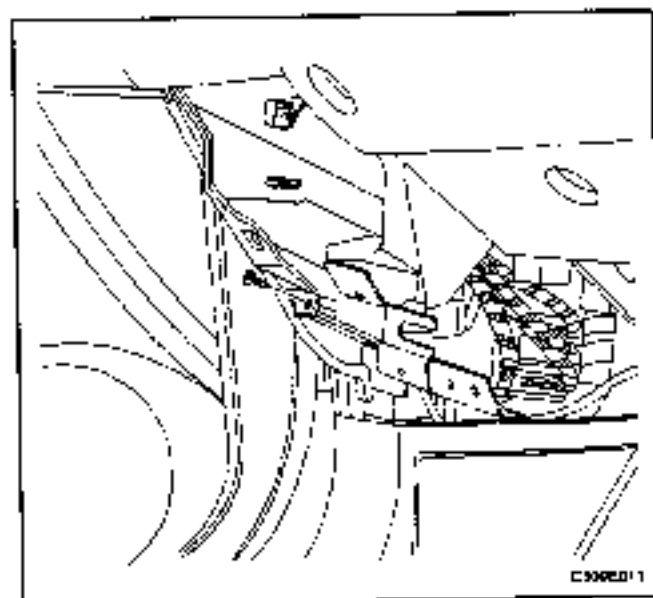
1. Disconnect the negative battery cable.
2. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Remove the defective bulb from the rear of the cluster.



C104E310

### Installation Procedure

1. Install the new bulb
2. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
3. Connect the negative battery cable



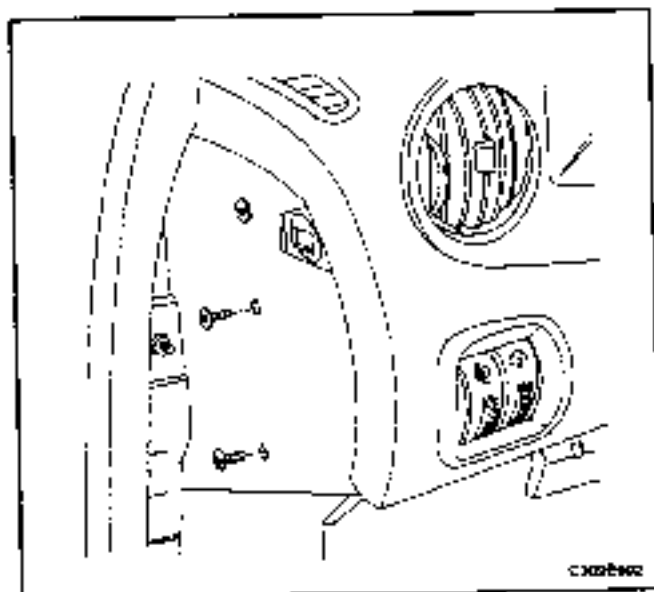
C300E011

### CHIME MODULE

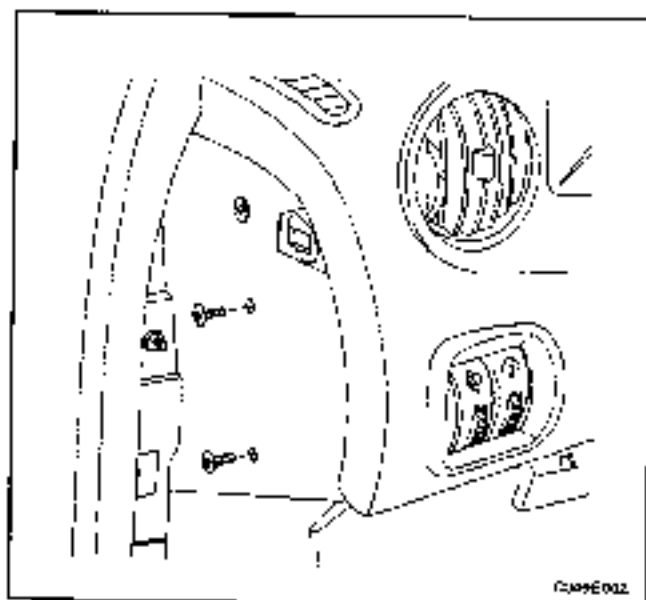
(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

1. Disconnect the negative battery cable
2. Remove the hood release handle screw and the knee bolster trim panel.
3. Remove the screw and the instrument panel side trim cover.
4. Disconnect the electrical connector
5. Remove the screws and the chime module.



C302B00

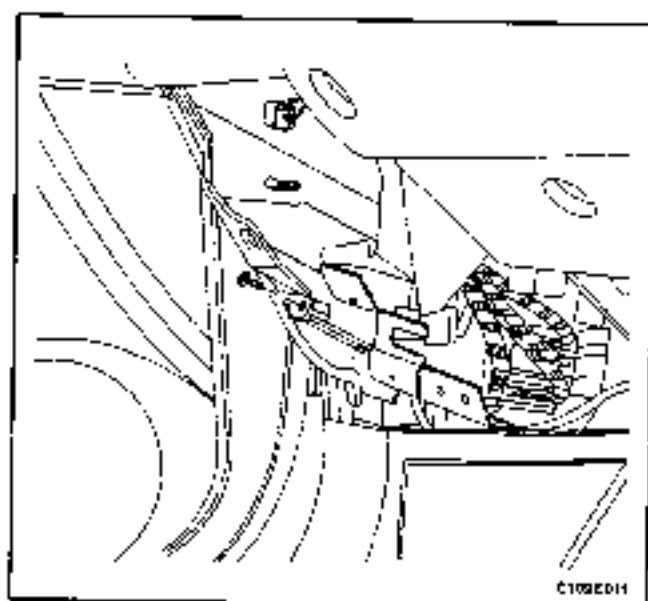


**Installation Procedure**

1. Install the chime module with the screws.

**Tighten**

Tighten the chime module screws to 4 N·m (35 lb-in).



2. Connect the electrical connector.
3. Install the instrument panel side trim cover with the screw.

**Tighten**

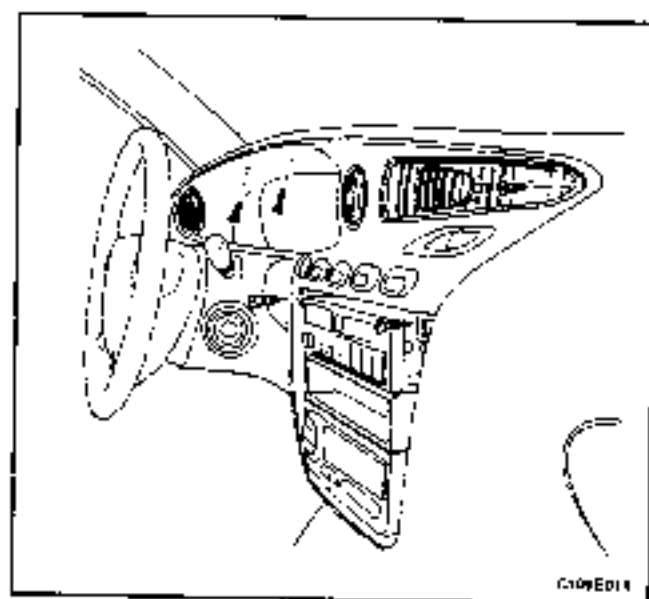
Tighten the instrument panel side trim cover screw to 2.5 N·m (22 lb-in).

4. Install the knee bolster trim panel with the hood release handle screw.

**Tighten**

Tighten the hood release handle screw to 2.5 N·m (22 lb-in).

5. Connect the negative battery cable.

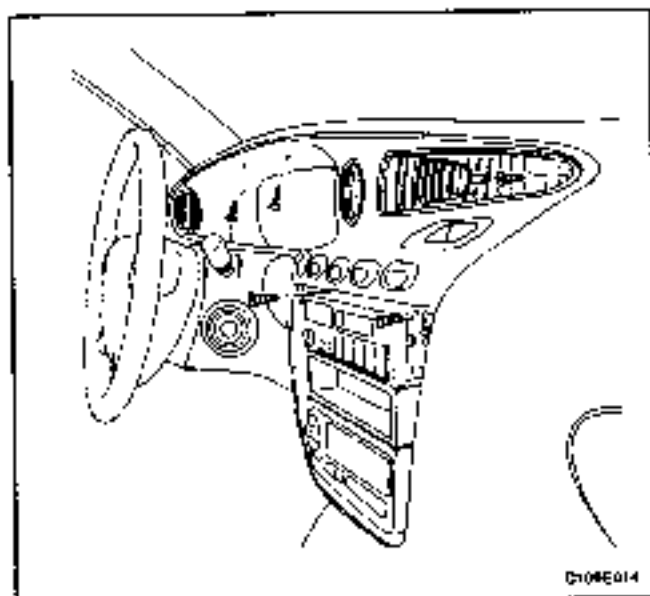


**INSTRUMENT CLUSTER TRIM PANEL**

(Left-Hand Drive Shown, Right-Hand Drive Similar)

**Removal Procedure**

1. Remove the audio system trim plate.
2. Remove the screws and the instrument cluster trim panel.
3. Disconnect the electrical connectors.



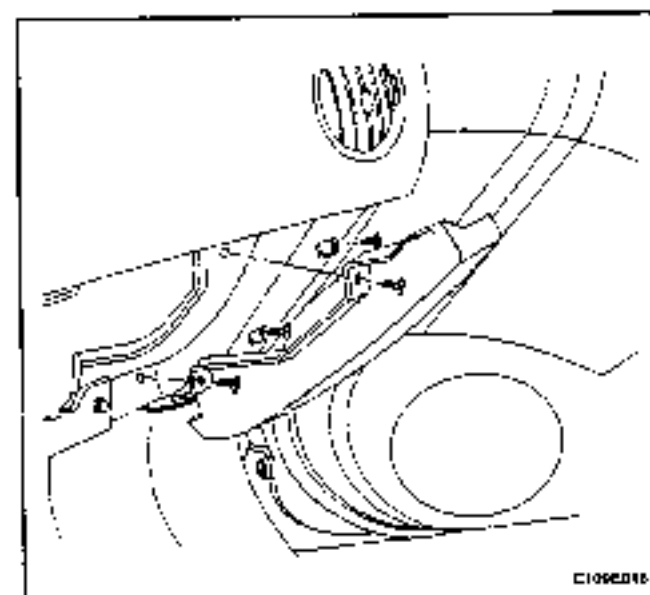
### Installation Procedure

1. Connect the electrical connectors.
2. Install the instrument cluster trim panel with the screws.

### Tighten

Tighten the instrument cluster trim panel screws to 3 N·m (27 lb-in).

3. Install the audio system trim plate.

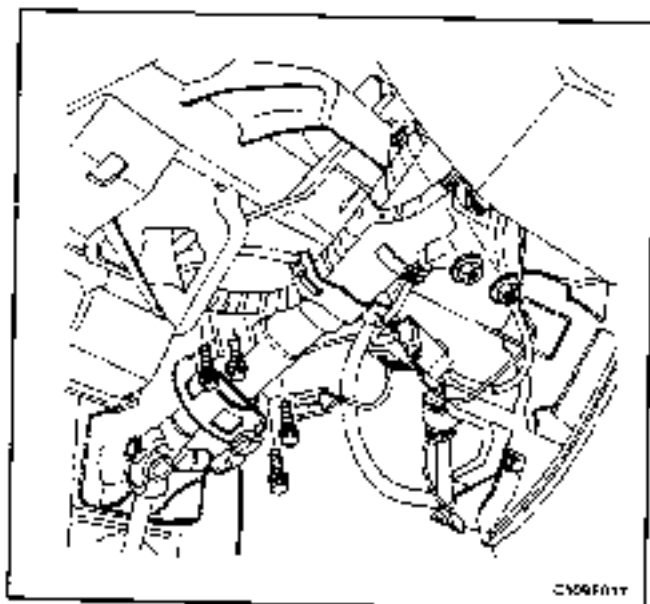


## INSTRUMENT PANEL

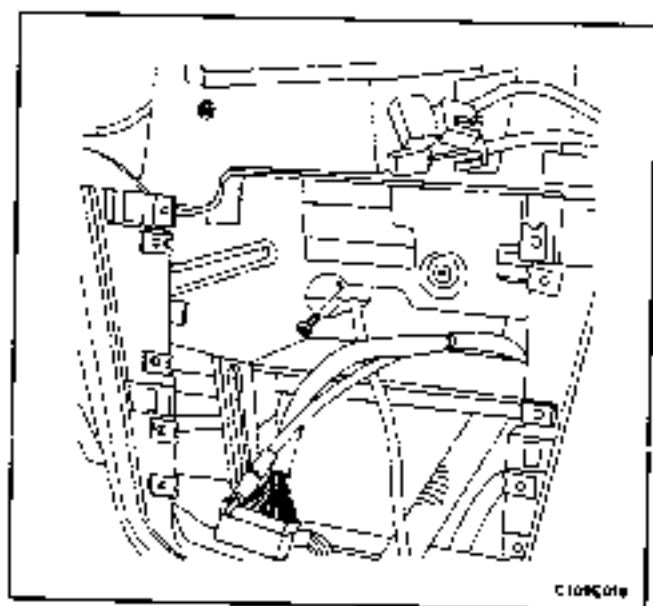
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to Section 9G, Interior Trim.
3. Remove the sun sensor and the automatic temperature controls assembly. Refer to Section 7D, Automatic Temperature Control Heating, Ventilation, and Air Conditioning System.
4. Remove the tweeter speakers and the stereo cassette AM/FM radio. Refer to Section 9F, Audio Systems.
5. Remove the screws and the instrument panel storage compartment.
6. Remove the instrument cluster dimmer/headlamp leveling switch assembly. Refer to "Instrument Cluster Dimmer/Headlamp Leveling Switch" in this section.
7. Remove the instrument cluster. Refer to "Instrument Cluster" in this section.
8. Remove the chime module. Refer to "Chime Module" in this section.
9. Remove the kick panels. Refer to Section 9G, Interior Trim.
10. Remove the glove box. Refer to "Glove Box" in this section.
11. Remove the screws and the glove box housing.
12. Disconnect the glove box housing electrical connectors.
13. Remove the screws and the passenger side knee bolster trim panel.
14. Remove the screws and the instrument panel side trim cover.



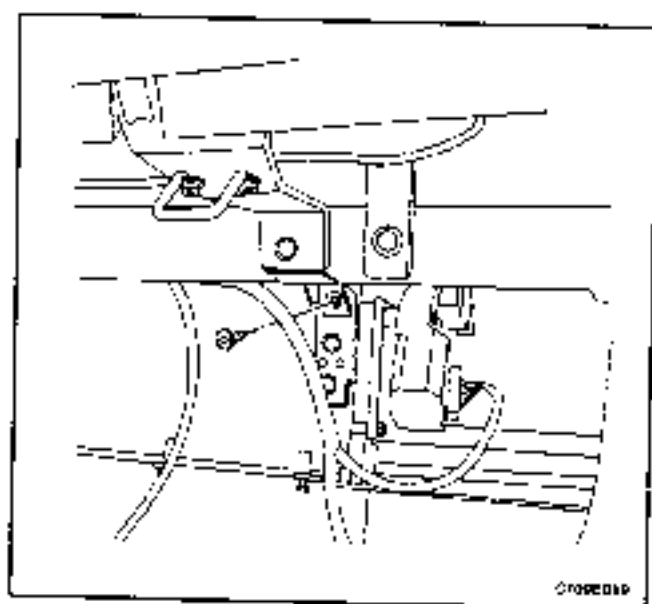
15. Remove the nuts and the bolts securing the steering column



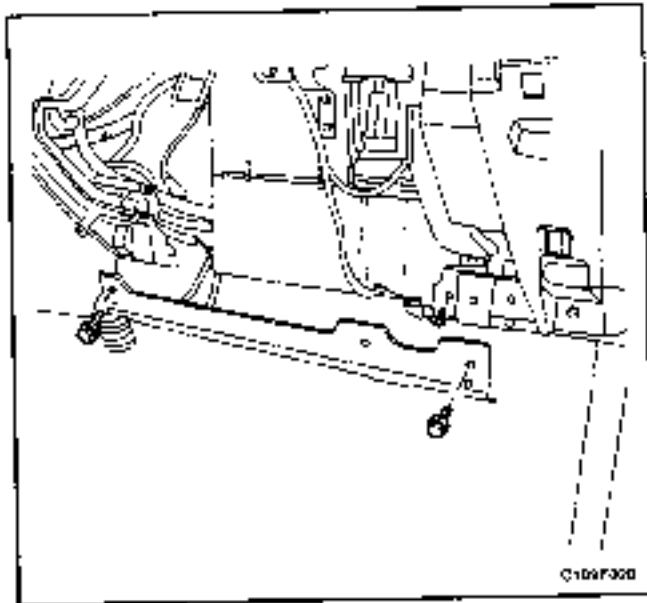
16. Disconnect the steering column electrical connectors.

17. Lower the steering column.

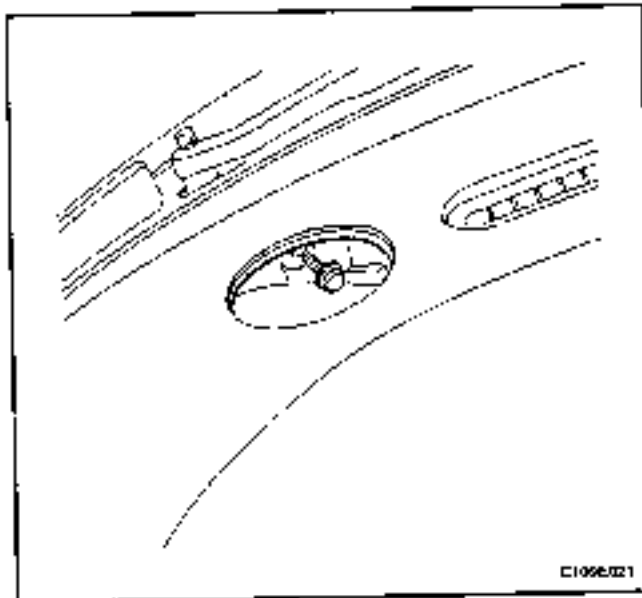
18. Remove the screw behind the stereo cassette AM/FM radio.



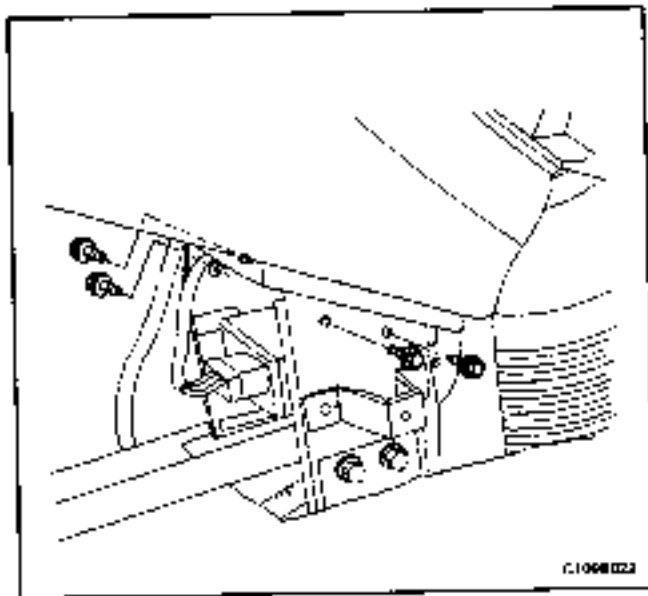
19. Remove the screw securing the instrument panel to the heater air distributor case.



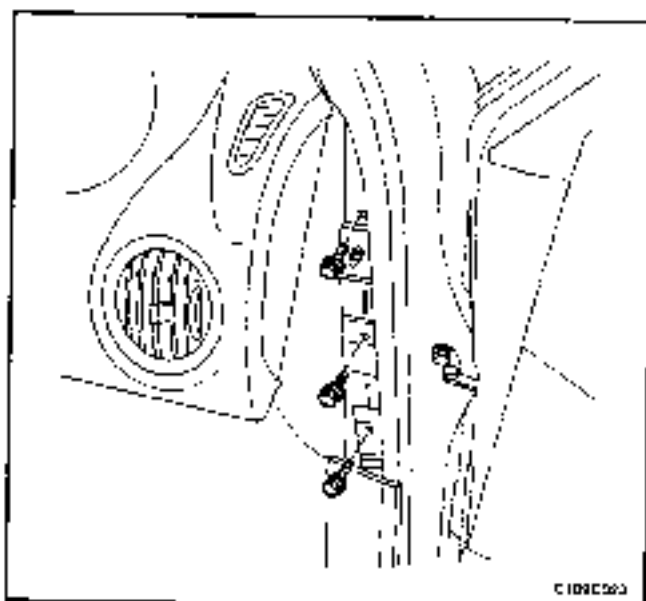
20. Remove the bolts and the glove box brace.
21. Remove the instrument panel screw behind the glove box brace.



22. Remove the instrument panel bolts below the windshield.

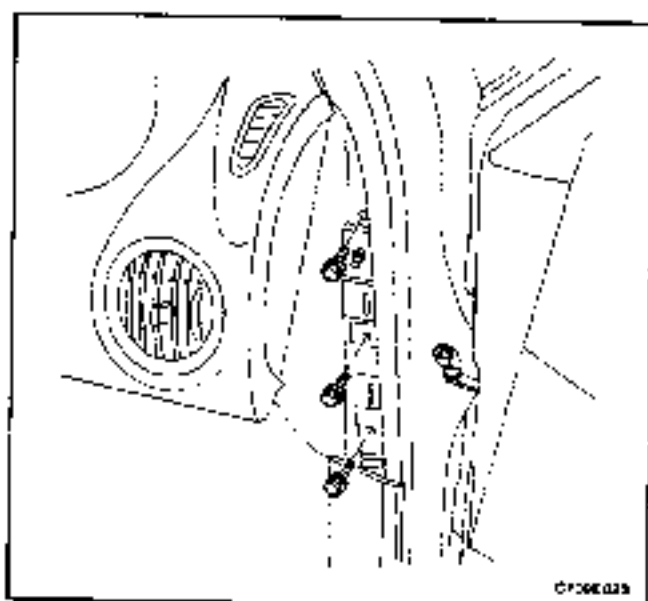


23. Remove the bolts securing the bottom of the instrument panel to the floor.



C109E263

24. Remove the bolts securing the sides of the instrument panel to the body.
25. Disconnect the instrument panel electrical connectors.
26. Remove the instrument panel.



C109E262

### Installation Procedure

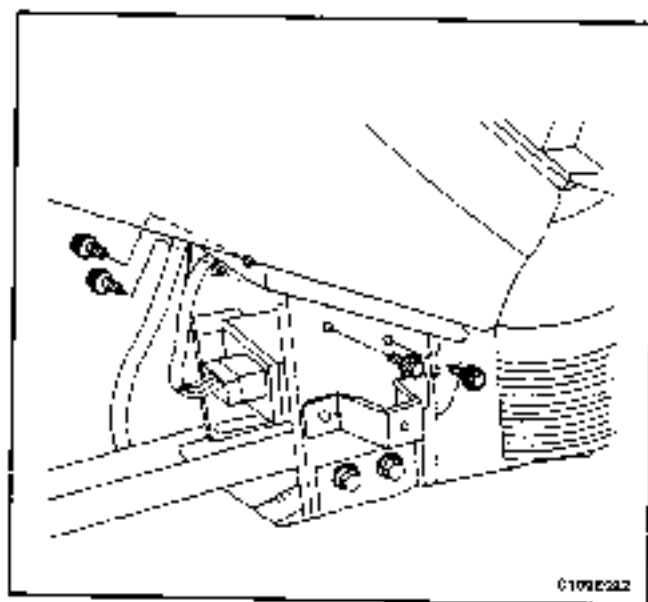
1. Position the instrument panel in the vehicle.
2. Connect the instrument panel electrical connectors.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the bolts securing the sides of the instrument panel to the body.

#### Tighten

Tighten the instrument panel-to-body bolts to 22 N•m (16 lb-ft).

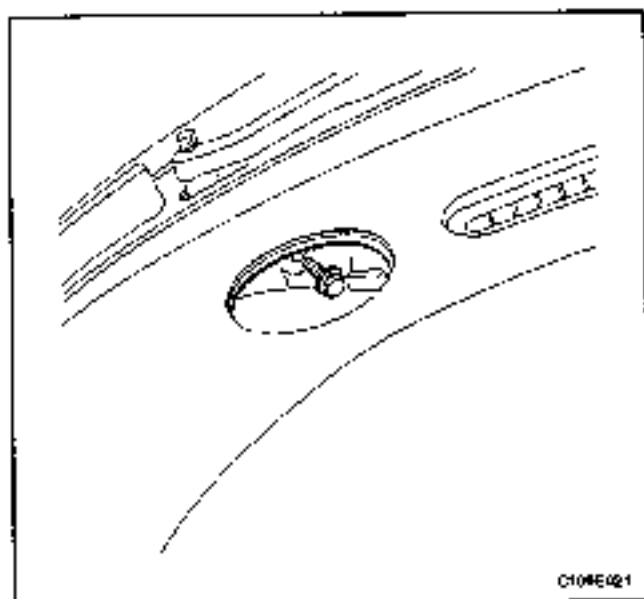


C109E262

4. Install the bolts securing the bottom of the instrument panel to the floor.

#### Tighten

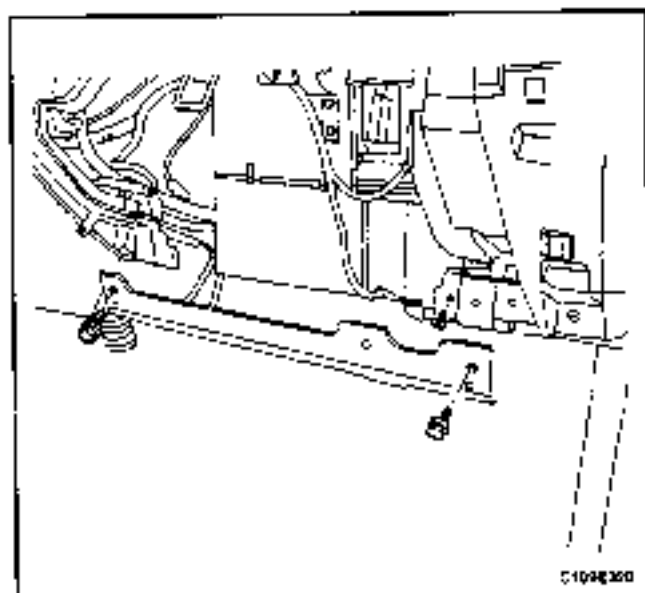
Tighten the instrument panel-to-floor bolts to 22 N•m (16 lb-ft).



5. Install the instrument panel bolts below the windshield.

**Tighten**

Tighten the instrument panel bolts below the windshield to 22 N•m (16 lb-ft).



6. Install the instrument panel screw behind the glove box brace.

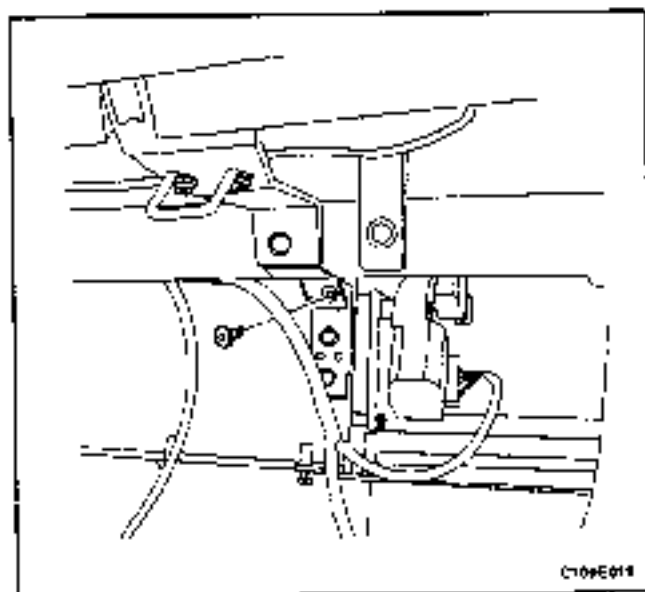
**Tighten**

Tighten the instrument panel screw behind the glove box brace to 2.5 N•m (22 lb-in).

7. Install the glove box brace with the bolts.

**Tighten**

Tighten the glove box brace bolts to 10 N•m (89 lb-in).

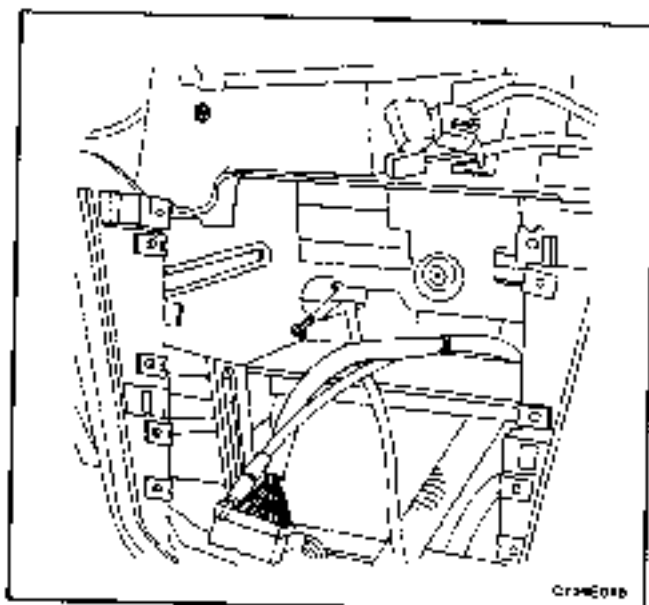


8. Install the screw securing the instrument panel to the heater air distributor case.

**Tighten**

Tighten the instrument panel-to-heater air distributor case screw to 4 N•m (35 lb-in).

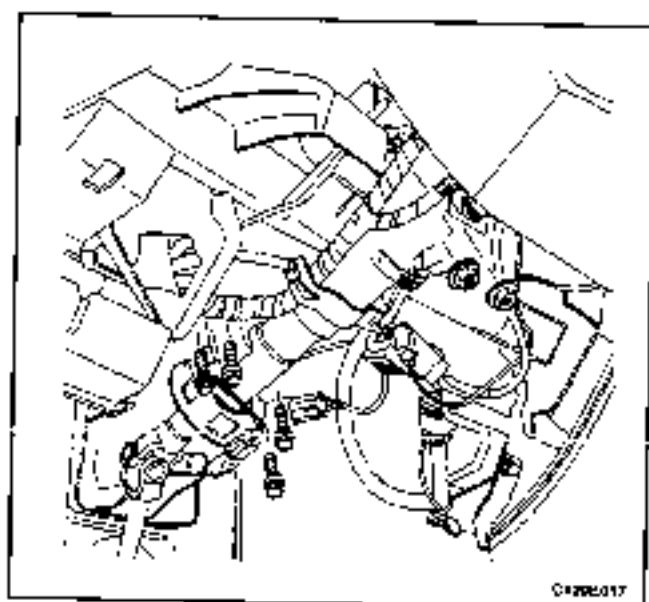




9. Install the screw behind the stereo cassette AM/FM radio.

**Tighten**

Tighten the instrument panel screw behind the stereo cassette AM/FM radio to 3 N·m (27 lb-in).

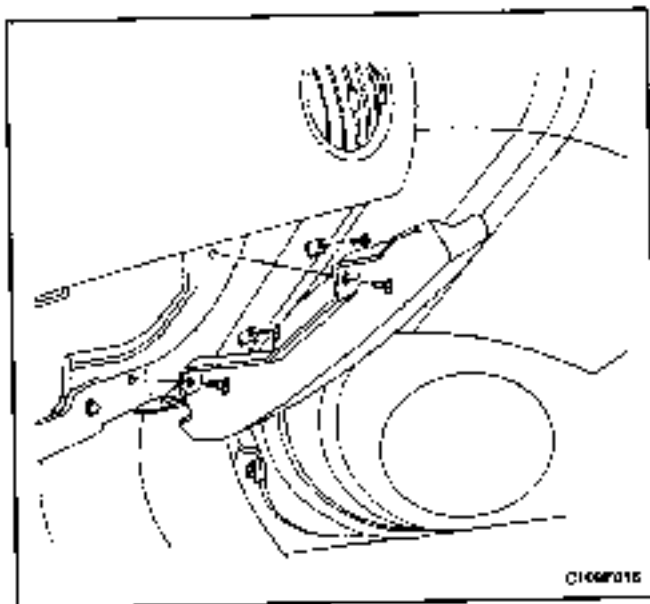


10. Raise the steering column.
11. Connect the steering column electrical connectors.
12. Install the nuts and the bolts securing the steering column.

**Tighten**

Tighten the steering column nuts to 22 N·m (16 lb-ft).

Tighten the steering column bolts to 22 N·m (16 lb-ft).



13. Install the instrument panel side trim cover with the screws.

**Tighten**

Tighten the instrument panel side trim cover screws to 2.5 N•m (22 lb•in).

14. Install the passenger side knee bolster trim panel with the screws.

**Tighten**

Tighten the passenger side knee bolster trim panel screws to 3 N•m (27 lb•in).

15. Connect the glove box housing electrical connectors.
16. Install the glove box housing with the screws.

**Tighten**

Tighten the glove box housing screws to 2.5 N•m (22 lb•in).

17. Install the glove box. Refer to "Glove Box" in this section.
18. Install the kick panels. Refer to Section 9G, Interior Trim.
19. Install the chime module. Refer to "Chime Module" in this section.
20. Install the instrument cluster. Refer to "Instrument Cluster" in this section.
21. Install the instrument cluster dimmer/headlamp leveling switch assembly. Refer to "Instrument Cluster Dimmer/Headlamp Leveling Switch" in this section.
22. Install the instrument panel storage compartment with the screws.

**Tighten**

Tighten the instrument panel storage compartment screws to 2.5 N•m (22 lb•in).

23. Install the tweeter speakers and the stereo cassette AM/FM radio. Refer to Section 9F, Audio Systems.
24. Install the sun sensor and the automatic temperature controls assembly. Refer to Section 7D, Automatic Temperature Control Heating, Ventilation, and Air Conditioning System.
25. Install the floor console. Refer to Section 9G, Interior Trim.
26. Connect the negative battery cable.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### CIGAR LIGHTER

The cigar lighter is located in the front portion of the floor console. To use the lighter, push it in completely. When the lighter is hot, it will release itself from contact with the heating element. The lighter and the heating element can be damaged if the lighter is not allowed to fully release itself from the heating element.

### ASHTRAY

The ashtray is located in the console. To access the ashtray, pull it out of the ashtray housing. The ashtray lamp will go on when the parking lamps or headlamps are turned on.

### INSTRUMENT PANEL VENTS

The center and the side vents in the instrument panel can be adjusted up and down and from side to side. The side vents can also be aimed toward the side windows in order to defog them.

### GLOVE BOX

The glove box can be opened by pulling up on the latch handle. The glove box must be removed in order to gain access to the passenger-side airbag module (if equipped).

### DIGITAL CLOCK

The digital clock is located on the instrument panel above the radio. The clock is capable of an outside temperature display and a 12-hour or a 24-hour display.

### INSTRUMENT CLUSTER

The instrument cluster is located above the steering column and in the instrument cluster trim panel. The instrument cluster contains the instruments that provide the driver with vehicle performance information. The instrument cluster contains a speedometer, a tachometer, an odometer, a trip odometer, a temperature gauge, a fuel gauge and several indicator lamps. For replacement of the indicator lamp bulbs contained in the instrument cluster, refer to "Instrument Cluster Indicator Lamps Specifications" in this section.

### SPEEDOMETER

The speedometer measures the speed of the vehicle in km/h or mph (with km/h). It consists of an instrument cluster gauge connected to the vehicle speed sensor on the transaxle output shaft.

### TRIP ODOMETER

The trip odometer measures the distance the vehicle has traveled since it was last reset. It consists of an in-

strument cluster gauge connected to the sending unit on the transaxle output shaft. The trip odometer can be reset to zero at any time so that the driver can record the distance traveled from any starting point.

### FUEL GAUGE

The fuel gauge consists of an instrument cluster gauge connected to a sending unit in the fuel tank.

The fuel gauge indicates the quantity of fuel in the tank only when the ignition switch is turned to ON or ACC. When the ignition is turned to LOCK or START, the pointer may come to rest at any position.

### TEMPERATURE GAUGE

The temperature gauge consists of an instrument cluster gauge connected to a temperature sensor that is in contact with the circulating engine coolant.

The temperature gauge indicates the temperature of the coolant. Prolonged driving or idling in very hot weather may cause the pointer to move beyond the center of the gauge. The engine is overheating if the pointer moves into the red zone at the upper limit of the gauge.

### INSTRUMENT CLUSTER INDICATOR LAMPS

The instrument cluster contains indicator lamps that indicate the functioning of certain systems or the existence of potential problems with the operation of the vehicle. The indicator lamps are replaceable. For replacement of the indicator lamps contained in the instrument cluster, refer to "Instrument Cluster Indicator Lamps Specifications" in this section.

### TACHOMETER

The tachometer measures the engine's speed in terms of thousands of revolutions per minute. It consists of an instrument cluster gauge connected to a sending unit in the engine control module.

Do not operate the engine in the red zone; otherwise, engine damage may occur.

### CHIME MODULE

The chime module will sound in order to bring attention to one or more of several conditions. The following conditions will cause the chime to sound.

- The lights are on and the ignition switch is not in ACC, ON, or START.
- The ignition key is in the ignition switch when the driver's door is open.
- The seat belt is unbuckled when the ignition switch is in ACC, ON, or START.

Voltage is supplied at all times through the fuse block to power the chime module.



## SECTION 9F

# AUDIO SYSTEMS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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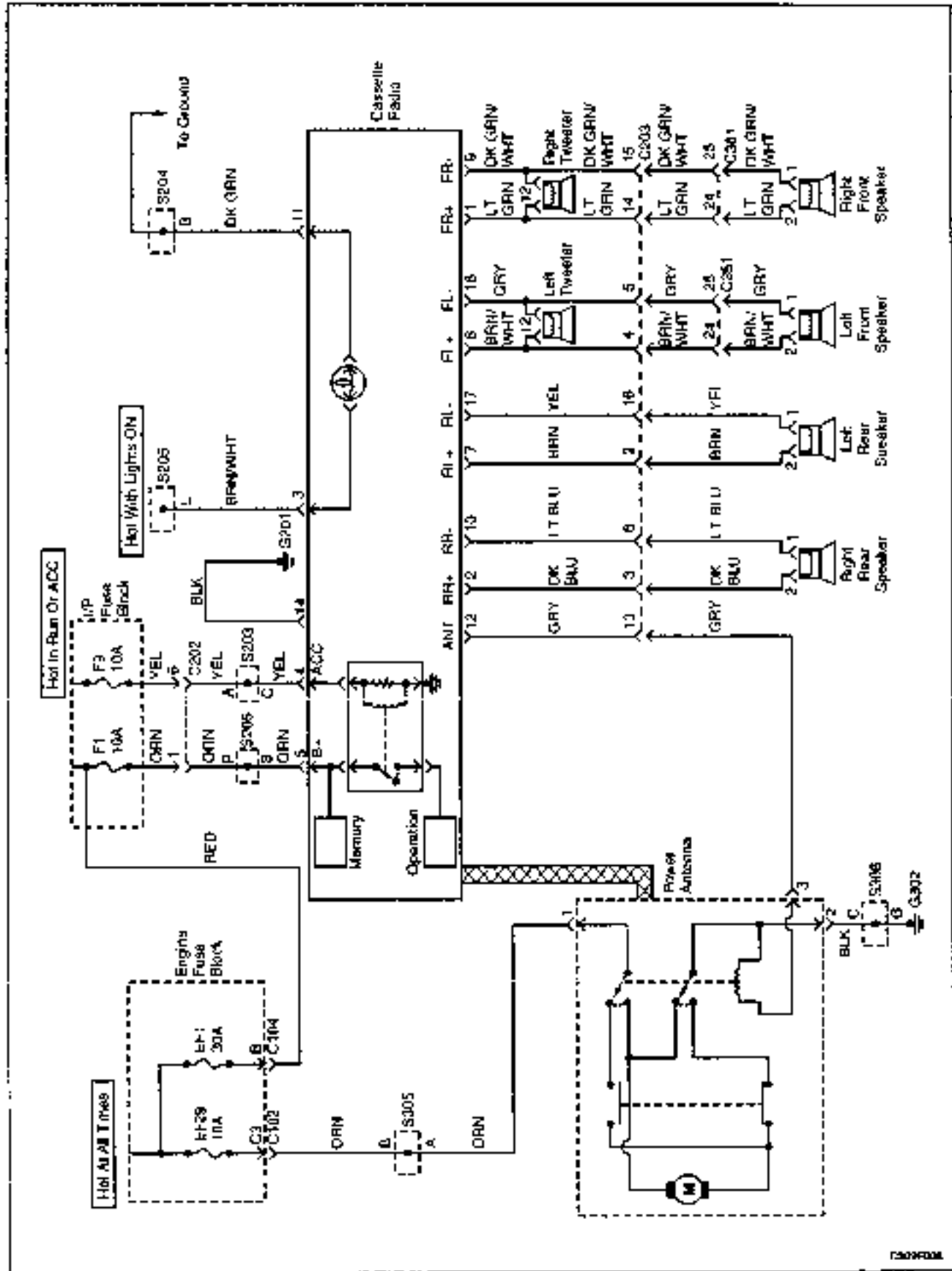
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Antenna Cap Nut	2.5	-	22
Antenna Motor Nuts	4	-	35
Audio System Screws	4	-	35
Front Door Speaker Screws	4	-	35
Rear Speaker Screws	2	-	18

# SCHEMATIC AND ROUTING DIAGRAMS

## AUDIO SYSTEM CIRCUIT



13039F00A

## DIAGNOSIS

### STEREO CASSETTE AM/FM RADIO

#### AM/FM Cassette Radio Inoperative

Step	Action	Value	Yes	No
1	Check fuses EF1, F1, and F9. Are fuses EF1, F1, and F9 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuses. Is the repair complete?		System OK	-
3	1. Use a voltmeter to test for battery voltage at fuses EF1 and F9. 2. Turn the ignition ON and test for battery voltage at fuse F1. Does the voltage match the specified value at fuses EF1, F1 and F9?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply circuit to the fuses. Is the repair complete?	-	System OK	-
5	1. Remove the cassette radio. 2. Turn the ignition ON. 3. Use a voltmeter to test for battery voltage at the audio system connector terminals 4 and 5. Does the battery voltage match the specified value at both terminals?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the audio system connector and the fuse. Is the repair complete?	-	System OK	-
7	Use an ohmmeter to test the ground circuit at the audio system connector terminal 14. Does the resistance match the specified value?	$\approx 0 \Omega$	Go to Step 9	Go to Step 8
8	Repair the open ground circuit between the audio system connector and ground. Is the repair complete?	-	System OK	-
9	Replace the audio system. Is the repair complete?	-	System OK	-

#### Cassette Player Inoperative, AM/FM Functions OK

Step	Action	Value	Yes	No
1	Verify the customer's complaint. Does the cassette player destroy tapes?	-	Go to Step 5	Go to Step 2
2	Using a good-quality tape, determine whether the cassette player performs poorly or is inoperative. Does the cassette player perform poorly?	-	Go to Step 5	Go to Step 3
3	Check the cassette player for obstructions behind the tape door. Is an obstruction found?	-	Go to Step 4	Go to Step 8
4	Check to see if the obstruction can be removed using gentle force. Is the obstruction removed?	-	Go to Step 5	Go to Step 6

**Cassette Player Inoperative, AM/FM Functions OK (Cont'd)**

Step	Action	Value	Yes	No
5	Clean the cassette player head, the capstan, and the drive system. Does the tape play properly?	-	Go to Step 7	Go to Step 6
6	Replace the audio system. Is the repair complete?	-	System OK	-
7	Check the cassette player for normal operation. Is the repair complete?	-	System OK	-
8	Advise the owner of a defective or worn tape. Is the repair complete?	-	System OK	-

**FM Does Not Work, AM and Cassette OK**

Step	Action	Value	Yes	No
1	Check the audio system for normal operation. Is FM inoperative and the rest of the system operating properly?	-	Go to Step 2	System OK
2	Replace the radio. Is the repair complete?	-	System OK	-

**AM Radio Does Not Work, FM and Cassette OK**

Step	Action	Value	Yes	No
1	1. Unplug the antenna cable from the antenna. 2. Connect the test antenna to the antenna cable. 3. Check the AM radio reception. Is the AM radio operating properly?	-	Go to Step 2	Go to Step 3
2	Replace the antenna. Is the repair complete?	-	System OK	-
3	1. Remove the audio system from the instrument panel. 2. Unplug the antenna cable from the audio system. 3. Plug the test antenna into the audio system. 4. Check the AM radio reception. Is the AM radio operating properly?	-	Go to Step 4	Go to Step 5
4	Replace the antenna cable between the audio system and the antenna. Is the repair complete?	-	System OK	-
5	Replace the audio system. Is the repair complete?	-	System OK	-



**SPEAKERS****Front Speakers Distorted or Inoperative, Rest of Audio System OK**

Step	Action	Value	Yes	No
1	1. Turn the ignition and the radio ON. 2. Check for distorted or inoperative front speakers using the fader and the balance controls with all of the sources (AM, FM, tape, CD). Are the front speakers distorted?	-	Go to Step 2	Go to Step 4
2	Check the speaker and the door area for damage, rattles, or vibration. Is the distortion caused by anything loose or in the way of the speaker?	-	Go to Step 3	Go to Step 4
3	Make the necessary repairs to secure the component causing the distortion. Is the repair complete?	-	System OK	-
4	1. Remove the front speakers and disconnect the speaker connector. 2. Using an ohmmeter, test the speaker wires for a short to ground. Does the ohmmeter show the specified value?	=	Go to Step 6	Go to Step 5
5	Repair the short circuit between the front speaker connector and the radio connector. Is the repair complete?	-	System OK	-
6	Substitute a known good speaker for the speaker causing the distortion. Is the distortion eliminated?	-	Go to Step 7	Go to Step 8
7	Replace the speaker. Is the repair complete?	-	System OK	-
8	Replace the audio system. Is the repair complete?	-	System OK	-

**Rear Speakers Distorted or Inoperative, Rest of Audio System OK**

Step	Action	Value	Yes	No
1	1. Turn the ignition and the radio ON. 2. Check for distorted or inoperative rear speakers using the fader and the balance controls with all of the sources (AM, FM, tape, CD). Are the rear speakers distorted?	-	Go to Step 2	Go to Step 4
2	Check the speakers, the rear deck, and the trunk area for damage, rattles, or vibration. Is the distortion caused by anything loose or in the way of the speaker?	-	Go to Step 3	Go to Step 4
3	Make the necessary repairs to secure the component causing the distortion. Is the repair complete?	-	System OK	-
4	1. Disconnect the rear speakers. 2. Using an ohmmeter, test the speaker wires for a short to ground. Does the ohmmeter show the specified value?	x	Go to Step 6	Go to Step 5
5	Repair the short circuit between the rear speaker connector and the radio connector. Is the repair complete?	-	System OK	-

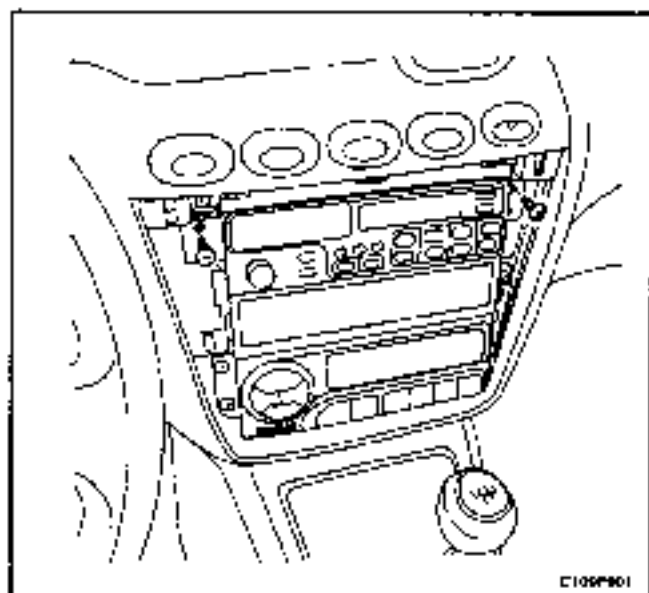
**Rear Speakers Distorted or Inoperative, Rest of Audio System OK (Cont'd)**

Step	Action	Value	Yes	No
6	Substitute a known good speaker for the speaker causing the distortion. Is the distortion eliminated?	-	Go to Step 7	Go to Step 8
7	Replace the speaker. Is the repair complete?	-	System OK	-
8	Replace the audio system. Is the repair complete?	-	System OK	-

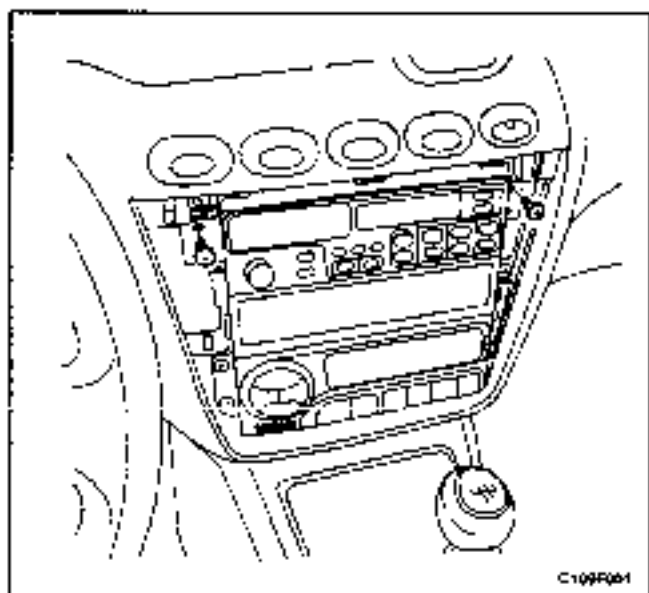
**ANTENNA****Power Antenna Does Not Work**

Step	Action	Value	Yes	No
1	Check fuse EF29. Is fuse EF29 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse. Is the repair complete?	-	System OK	-
3	Use a voltmeter to test for battery voltage at fuse EF29. Does the battery voltage match the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit to fuse EF29. Is the repair complete?	-	System OK	-
5	Use a voltmeter to test for battery voltage at power antenna connector terminal 1. Does the battery voltage match the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between the power antenna connector terminal 1 and fuse EF29. Is the repair complete?	-	System OK	-
7	Use an ohmmeter to test the ground circuit at the power antenna connector terminal 2. Does the resistance match the specified value?	= 0 $\Omega$	Go to Step 9	Go to Step 8
8	Repair the open ground circuit between the power antenna connector terminal 2 and ground. Is the repair complete?	-	System OK	-
9	1. Turn the ignition ON. 2. Turn the radio ON. 3. Use a voltmeter to test for battery voltage at the power antenna connector terminal 2. Does the voltage match the specified value?	11-14 v	Go to Step 10	Go to Step 11
10	Replace the power antenna. Is the repair complete?	-	System OK	-
11	1. Turn the ignition ON. 2. Turn the radio ON. 3. Use a voltmeter to test for battery voltage at radio terminal 12. Does the battery voltage match the specified value?	11-14 v	Go to Step 12	Go to Step 13

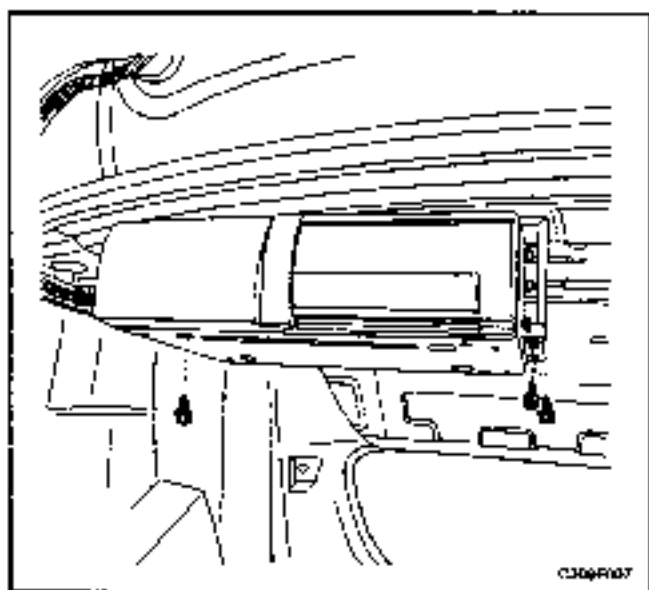
12	Repair the open circuit between the radio connector and the power antenna connector terminal (3). Is the repair complete?	-	System OK	-
13	Replace the audio system. Is the repair complete?	-	System OK	-



C109P01



C109P04



C109P07

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### STEREO CASSETTE AM/FM RADIO

##### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the audio system trim plate.
3. Remove the screws and the audio system.
4. Disconnect the audio system electrical connectors.

##### Installation Procedure

1. Connect the audio system electrical connectors.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the audio system with the screws.

##### Tighten

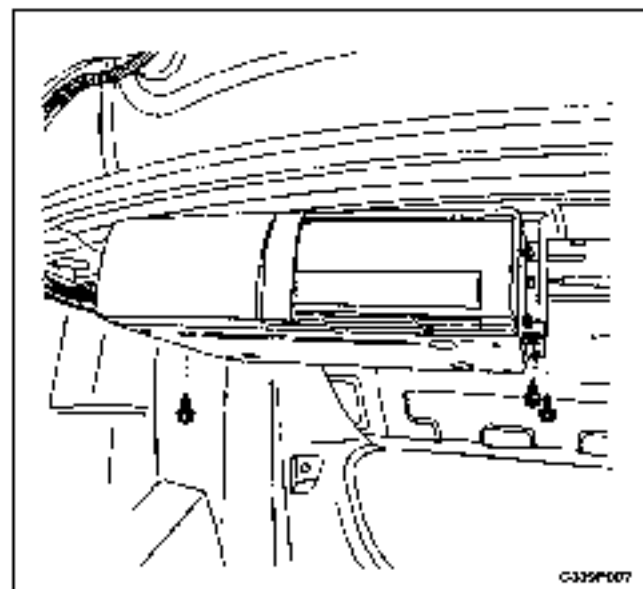
Tighten the audio system screws to 4 N·m (35 lb-in).

3. Install the audio system trim plate.
4. Connect the negative battery cable.

#### CD CHANGER

##### Removal Procedure

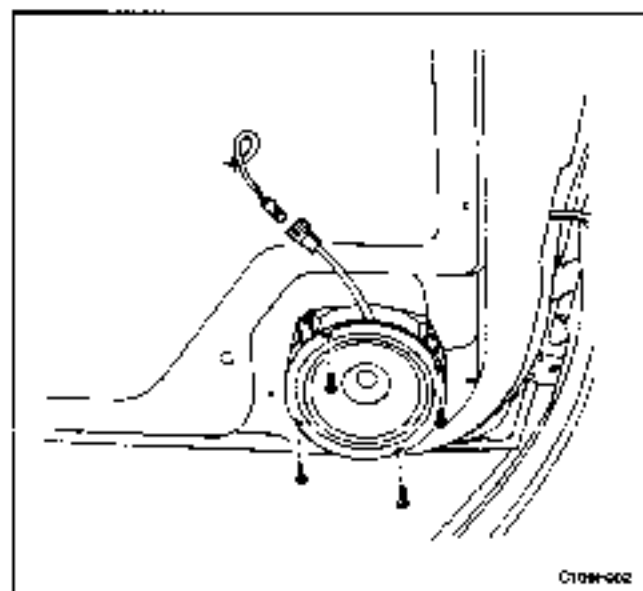
1. Disconnect the negative battery cable.
2. Disconnect the CD changer electrical connector.
3. Remove the bolts and the CD changer from the CD changer bracket.



C339P007

### Installation Procedure

1. Install the CD changer with the bolts.
2. Connect the CD changer electrical connector.
3. Connect the negative battery cable.

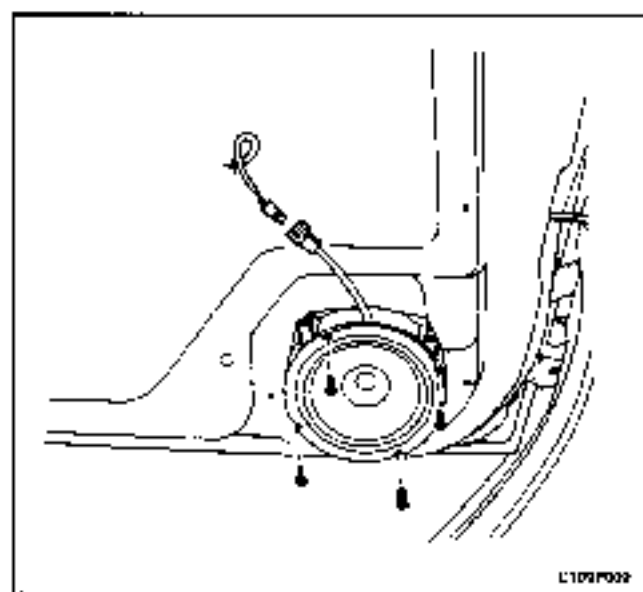


C108P002

### FRONT DOOR SPEAKERS

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the front door trim panel. Refer to Section 9G, Interior Trim.
3. Disconnect the electrical connector.
4. Remove the screws and the front door speaker.



L109P002

#### Installation Procedure

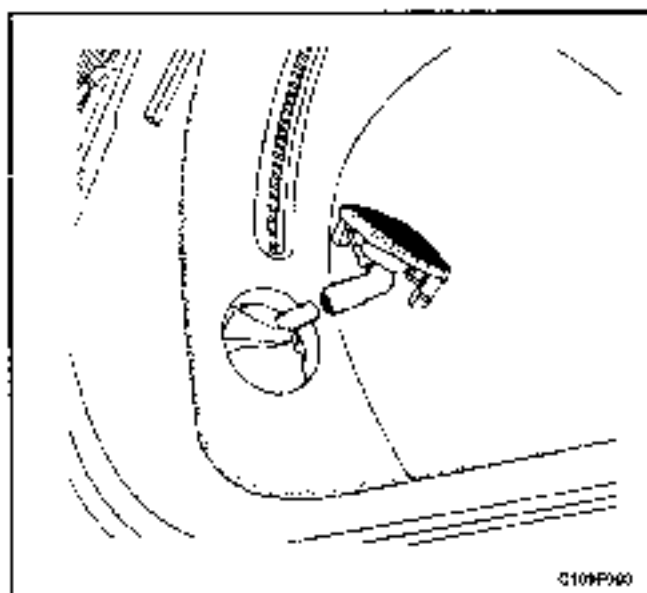
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the front door speaker with the screws.

#### Tighten

Tighten the front door speaker screws to 4 N·m (35 lb-in).

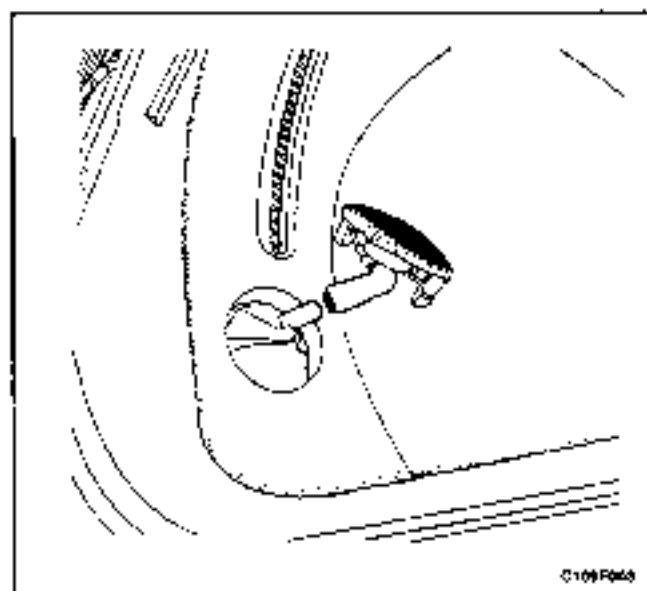
2. Connect the electrical connector.
3. Install the front door trim panel. Refer to Section 9G, Interior Trim.
4. Connect the negative battery cable.



## TWEETER SPEAKERS

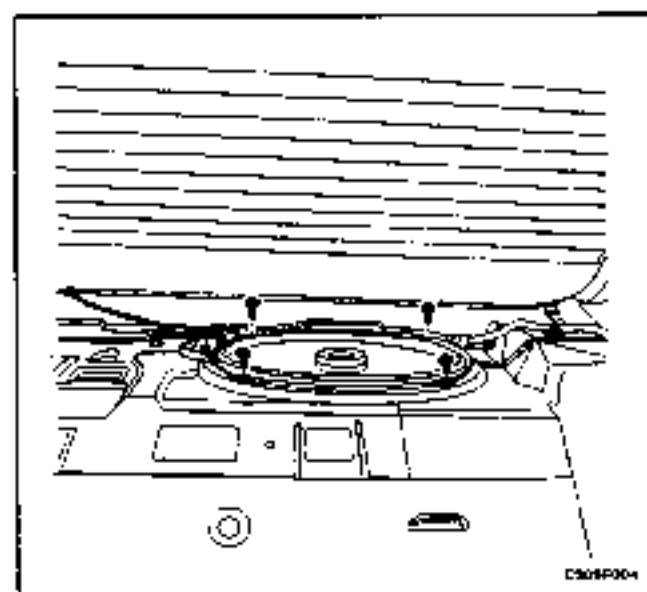
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the tweeter speaker by prying the tweeter speaker out of the instrument panel.
3. Disconnect the electrical connector.



### Installation Procedure

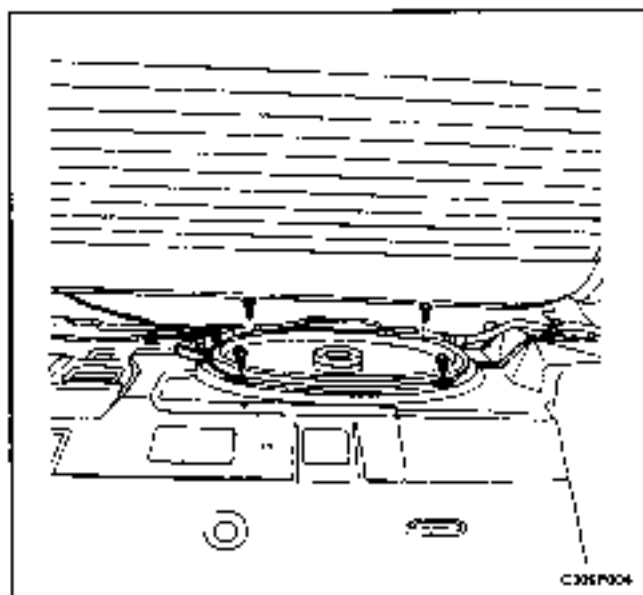
1. Connect the electrical connector.
2. Install the tweeter speaker into the instrument panel.
3. Connect the negative battery cable.



## REAR SPEAKERS

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the deck lid sill plate cover. Refer to Section 9G, *Interior Trim*.
3. Disconnect the electrical connector.
4. Remove the screws and the rear speakers.



### Installation Procedure

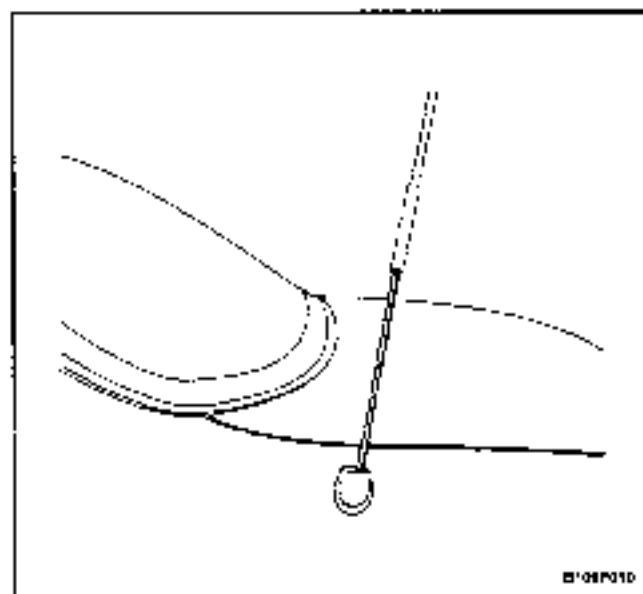
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the rear speakers with the screws.

#### Tighten

Tighten the rear speaker screws to 2 N·m (18 lb-in).

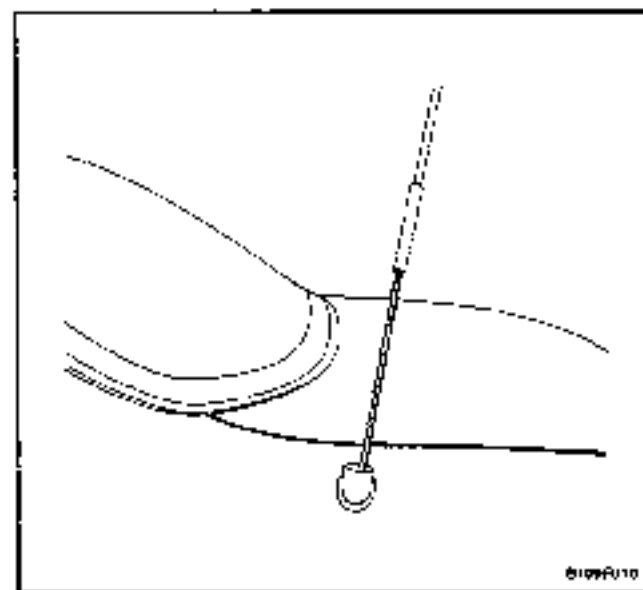
2. Connect the electrical connector.
3. Install the deck lid sill plate cover. Refer to Section 9G, *Interior Trim*.
4. Connect the negative battery cable.



### POWER ANTENNA MAST

#### Removal Procedure

1. Remove the antenna cap nut and the rubber grommet.
2. Turn on the radio and remove the antenna mast and the cable.
3. Turn off the radio.

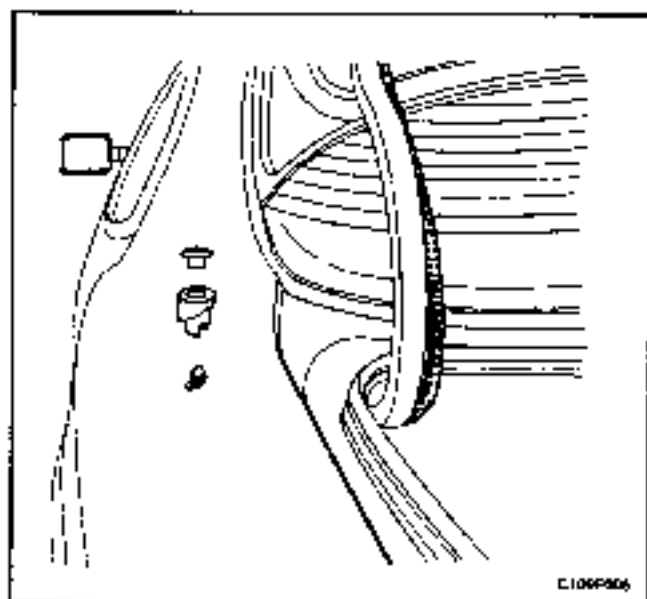


#### Installation Procedure

1. Install the antenna mast with the teeth of the cable facing the front of the vehicle.
2. Install the rubber grommet and the antenna cap nut.

#### Tighten

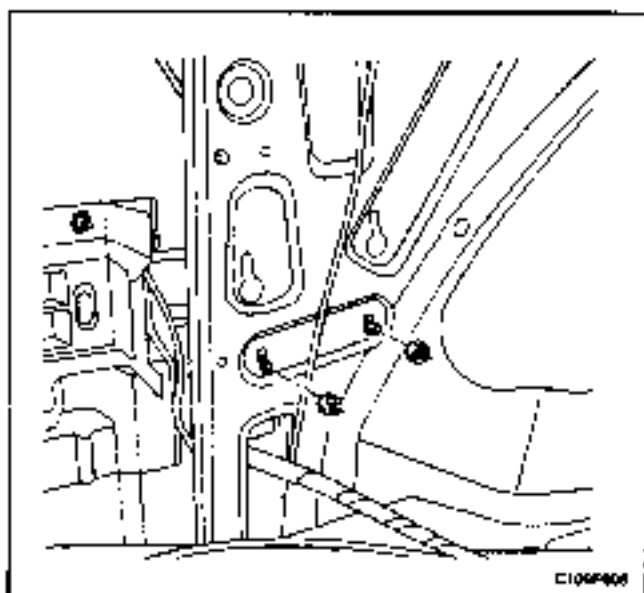
Tighten the antenna cap nut to 2.5 N·m (22 lb-in).



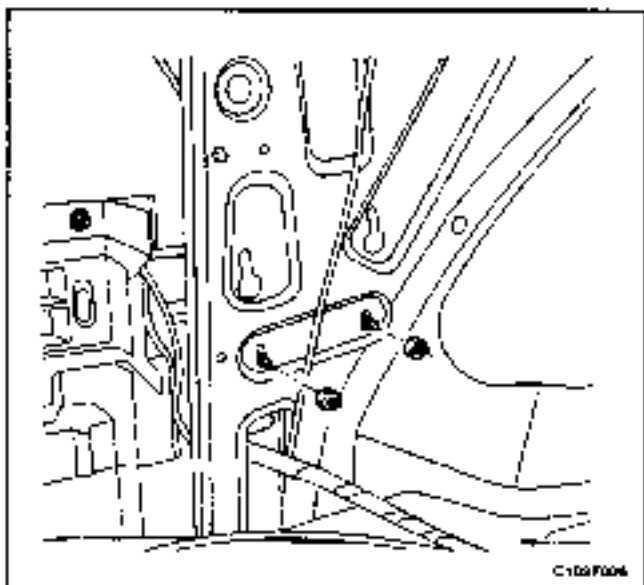
## POWER ANTENNA MOTOR/MANUAL ANTENNA

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the luggage compartment wheelhouse trim panel. Refer to *Section 9G, Interior Trim*.
3. Remove the antenna cap nut and the rubber grommet.



4. Disconnect the electrical connector and the drain hose from the antenna motor.
5. Remove the nuts and the antenna motor (if equipped) (Power antenna shown, manual antenna similar).



### Installation Procedure

1. Connect the electrical connector and the drain hose to the antenna motor (if equipped).

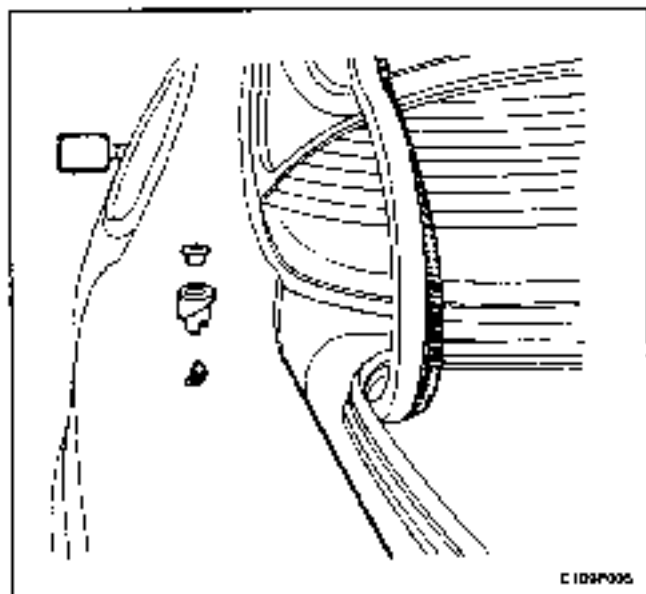
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the antenna motor with the nuts

#### Tighten

Tighten the antenna motor nuts to 7.5 N-m (65 lb-in) (Power antenna shown, manual antenna similar.)





3. Install the rubber grommet and the antenna cap nut.

**Tighten**

Tighten the antenna cap nut to 2.5 N•m (22 lb-in).

4. Install the luggage compartment wheelhouse trim panel. Refer to Section 9G, Interior Trim.
5. Connect the negative battery cable.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### STEREO CASSETTE AM/FM RADIO

There are three audio systems offered. The stereo digital logic cassette AM/FM radio with electronic tape ejection is offered in standard and deluxe models. Both models feature RDS (radio data system) which automatically selects the best station within the chain of RDS stations currently being listened to. A trunk-mounted CD changer is also available.

### AUDIO SECURITY SYSTEM

The audio system features a double security system. First, the audio security system features a detachable face to the cassette radio. When the face is removed from the cassette radio, the audio system is rendered inoperative. The audio system cannot be operated until the original face is reinstalled or a new face is installed and the proper four-digit security code is entered.

Second, the audio security system is activated whenever the audio system circuit is disconnected from the battery. A four-digit security code must be entered in order for the audio system to be functional once again. The security code is stamped on a card located in the vehicle (usually in the glove box).

#### Entering The Four-Digit Security Code

1. With the ignition switch in the ACC or ON position, turn the radio on. At this time, CODE will appear on the radio display.
2. Press the 1 preset button until the correct first digit is shown on the display.
3. Repeat Step 2 using preset buttons 2, 3, and 4 until the four-digit security code is entered.
4. After entering the correct four-digit security code, press the AST button. CODE OK will briefly appear on the radio display. The system is now ready for operation.

#### Wrong Code

If the wrong code is entered, ERROR 1 will appear on the display. After the ERROR message, CODE will appear once again and the correct security code can be entered. With each new coding attempt, the length of time the ERROR message is displayed is doubled. A total of 10 coding attempts can be made.

### SPEAKERS

All audio systems use six speakers: two speakers mounted in the front doors, two speakers mounted in the rear deck lid sill plate and two tweeter speakers mounted on the top side of the instrument panel.

### MANUAL ANTENNA

The manual antenna is designed to withstand most car washes without damage. The antenna can be adjusted up or down by hand. If the mast becomes slightly bent, it can be straightened by hand. The manual antenna can be replaced if it is severely bent. Manual antennas must be kept clean for good performance.

### POWER ANTENNA

The power antenna is controlled by the radio. When the radio power is turned on, the antenna is extended. When the radio is turned off, either by turning the power off or by turning the ignition switch off, the antenna is retracted.

### TAPE PLAYER AND CASSETTE CARE

The head and the capstan are the two parts of the tape player that should be cleaned. This service should be performed every 100 hours of cassette operation.

In order to clean the head and the capstan, use a cotton swab dipped in rubbing alcohol.

A cassette cleaning kit may also be used to clean the head and the capstan. Follow the cleaning kit instructions to clean the tape player.

Do not touch the tape head with magnetized tools. If the head becomes magnetized, it will degrade cassettes played in the player. No service is performed on the cassettes. The cassette manufacturer handles warranties of the cassettes. Store cassettes away from extreme heat and direct sunlight.

### COMPACT DISC CARE

Handle discs carefully. Store the discs in protective cases away from the sun, heat, and dust. If the surface is soiled, dampen a clear, soft cloth in a solution of mild neutral detergent and wipe the disc clean. Miniclips (about 3 inches in diameter), will not eject and should not be used.

## SECTION 9G

# INTERIOR TRIM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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Kick Panel .....	9G-11		


## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Console-to-Parking Brake Assembly Screw	4	-	35
Cupholder Screw	2.5	-	22
Door Trim Panel Screws	2.5	-	22
Floor Console Screws	2.5	-	22
Gearshift Housing Bolts	7	-	62
Seat Belt Anchor Bolt	37	27	-

## SPECIAL TOOLS

### SPECIAL TOOLS TABLE

 <p>A 480003</p>	<p><b>KM-475-B</b> <b>Trim Remover</b></p>
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## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### FRONT DOOR TRIM PANEL

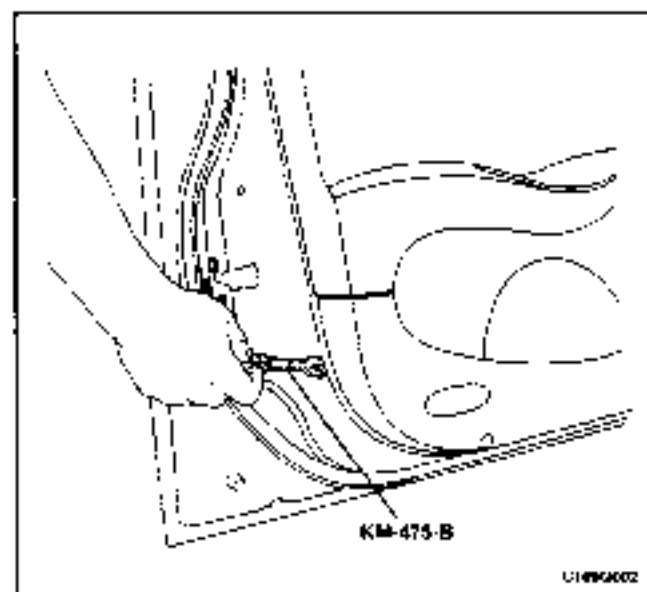
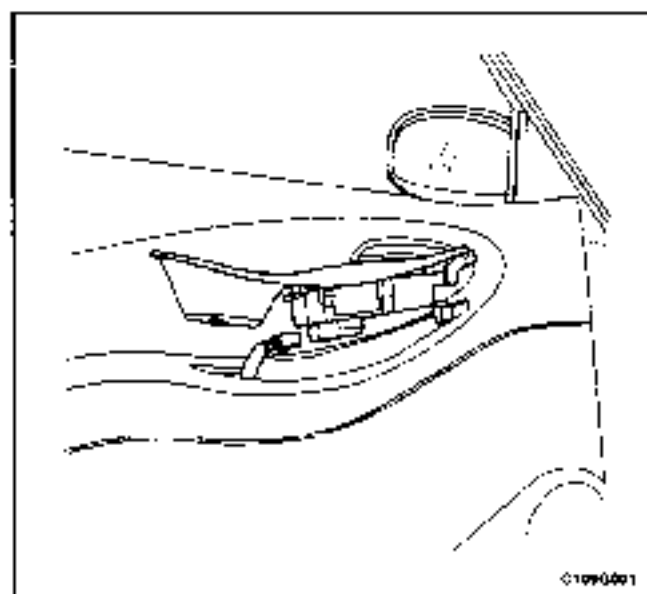
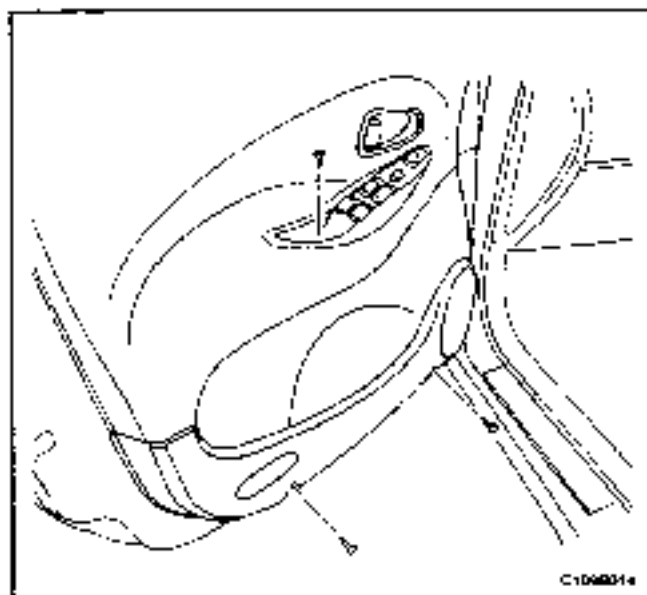
(Left-Hand Drive Shown, Right-Hand Drive Similar)

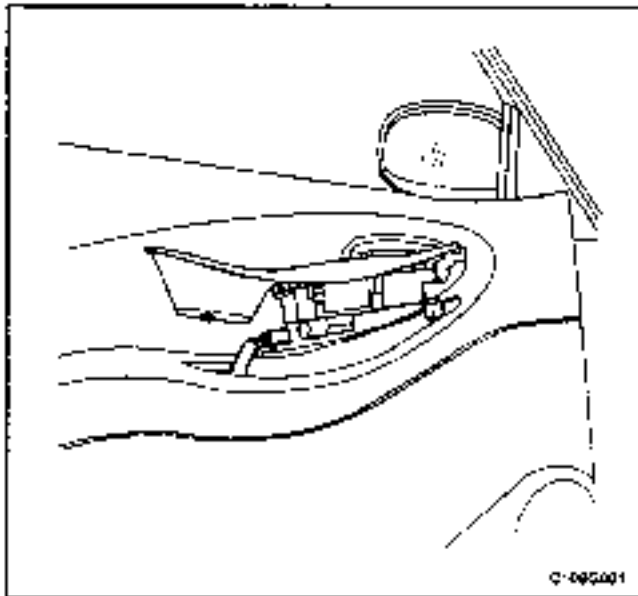
##### Tools Required

KM-475-B Trim Remover

##### Removal Procedure

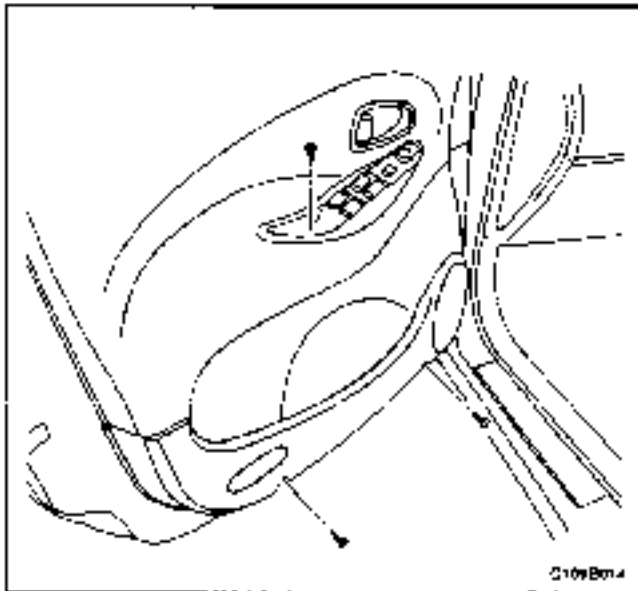
1. Lower the front window.
2. Pry off the inside door handle trim bezel.
3. Remove the door trim panel screws.
4. Remove the power window/mirror control switch.
5. Disconnect the power window/mirror control switch electrical connectors.
6. Pry off the trim panel using the trim remover KM-475-B.
7. Remove the door step lamp.





### Installation Procedure

1. Install the door step lamp.
2. Install the trim panel.
3. Connect the power window/mirror control electrical connectors.
4. Install the power window/mirror control switch.

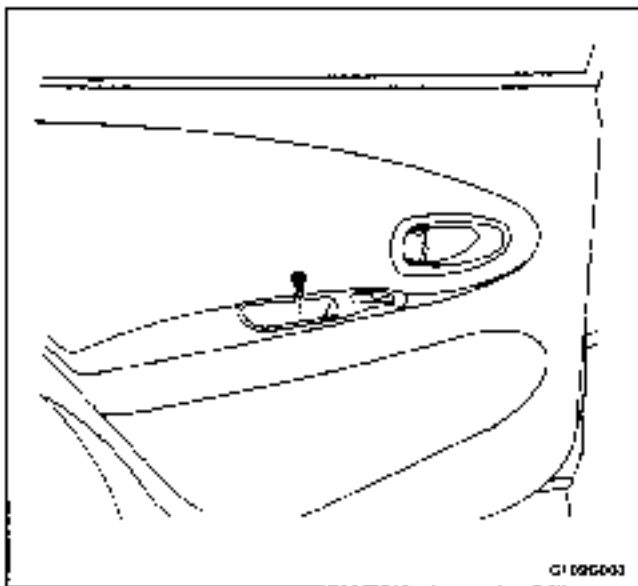


5. Install the door trim panel screws.

### Tighten

Tighten the door trim panel screws to 2.5 N•m (22 lb-in).

6. Install the inside door handle trim bezel.
7. Raise the front window.



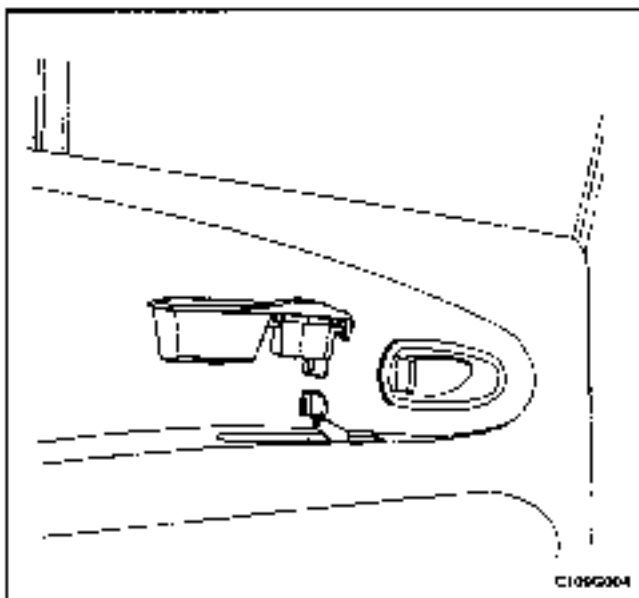
### REAR DOOR TRIM PANEL

#### Tools Required

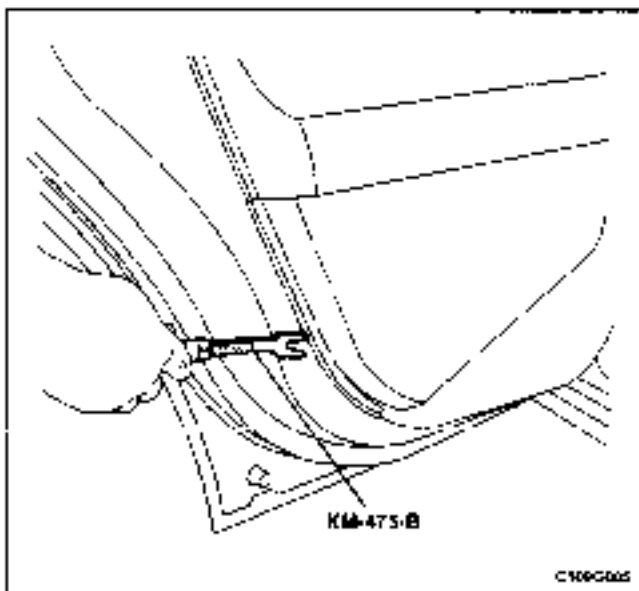
KM-475-B Trim Remover

#### Removal Procedure

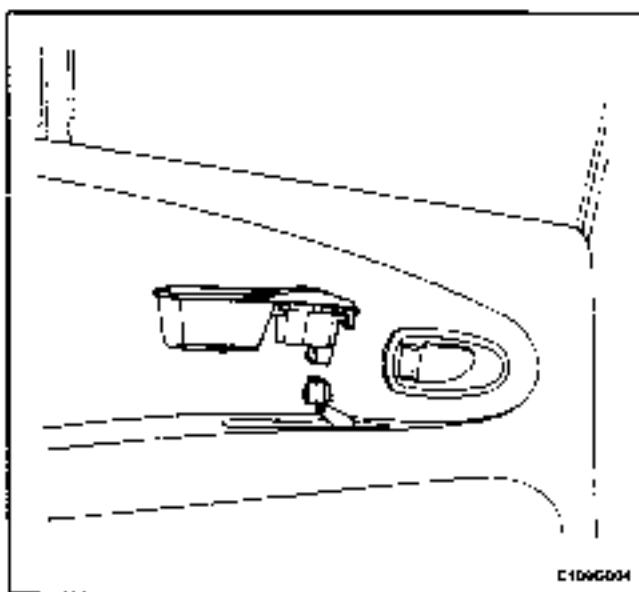
1. Lower the rear window.
2. Remove the manual rear window regulator, if equipped. Refer to Section 9P, Doors.
3. Pry off the inside door handle trim bezel.
4. Remove the door trim panel screw (power rear window regulator shown, manual rear window regulator similar).



- 5 Remove the power window control switch if equipped.
- 6 Disconnect the power window control switch electrical connector (power rear window regulator shown, manual rear window regulator similar).



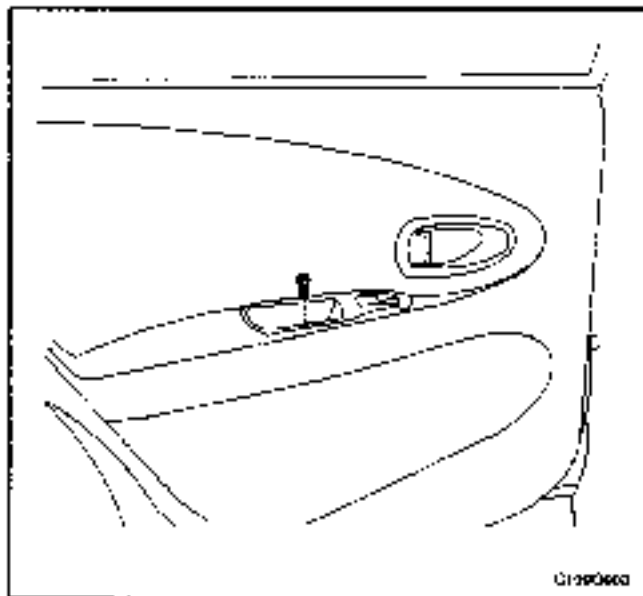
- 7 Pry off the trim panel using the trim remover KM-475-B.



**Installation Procedure**

- 1 Install the trim panel.
- 2 Connect the power window control switch electrical connector.
- 3 Install the power window control switch

## 9G-6 INTERIOR TRIM

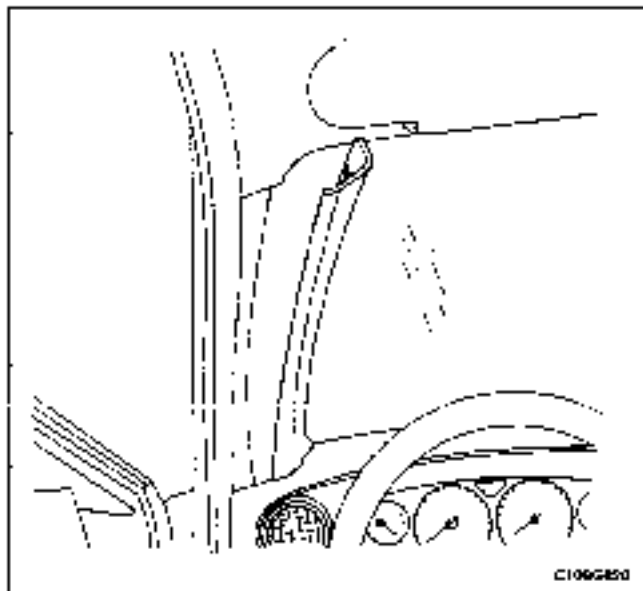


4. Install the door trim panel screw (power rear window regulator shown, manual rear window regulator similar).

### Tighten

Tighten the door trim panel screw to 2.5 N•m (22 lb•in).

5. Install the inside door handle trim bezel.
6. Install the manual rear window regulator, if equipped. Refer to Section 9P, Doors.
7. Raise the rear window.

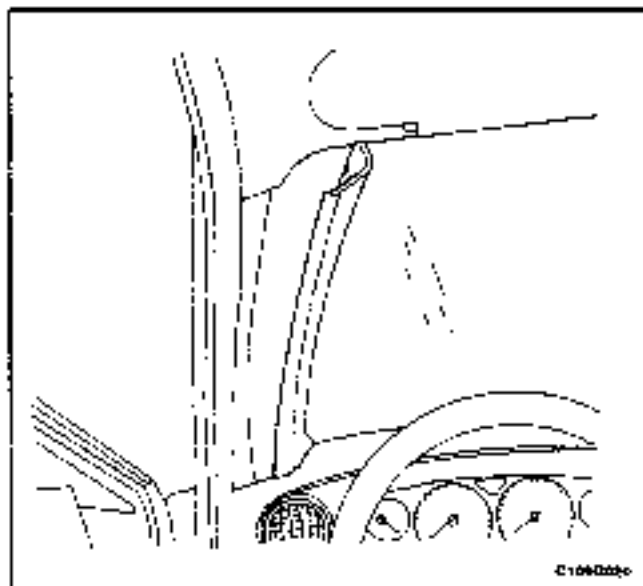


## A-PILLAR TRIM PANEL

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

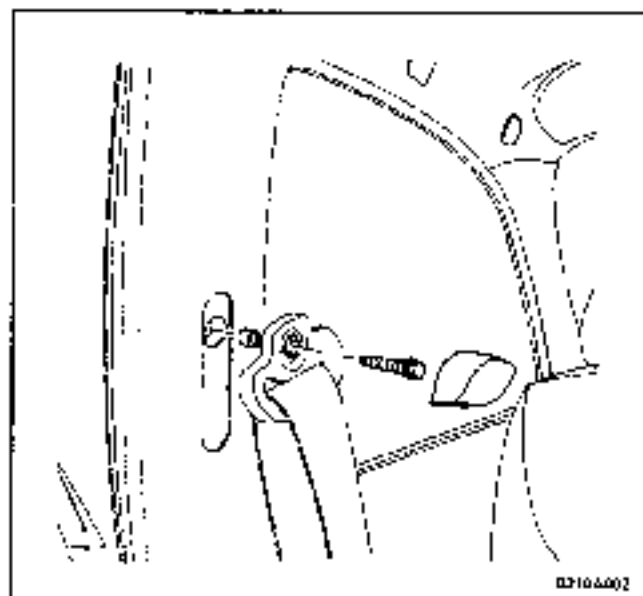
1. Remove the A-pillar trim panel.



### Installation Procedure

1. Install the A-pillar trim panel.

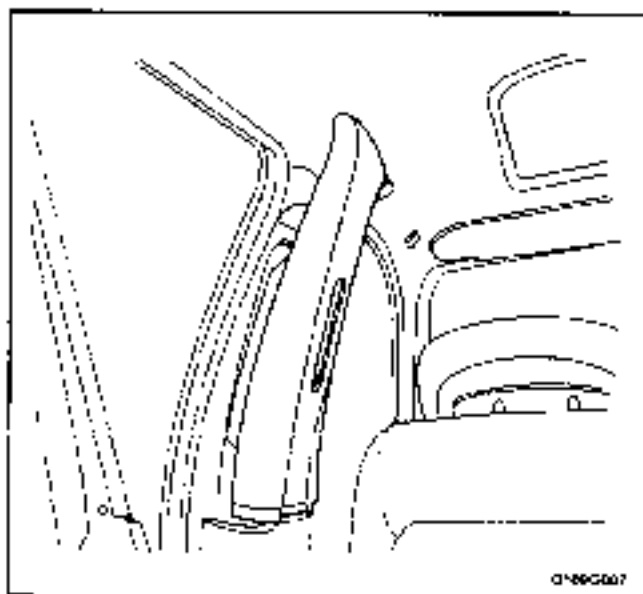




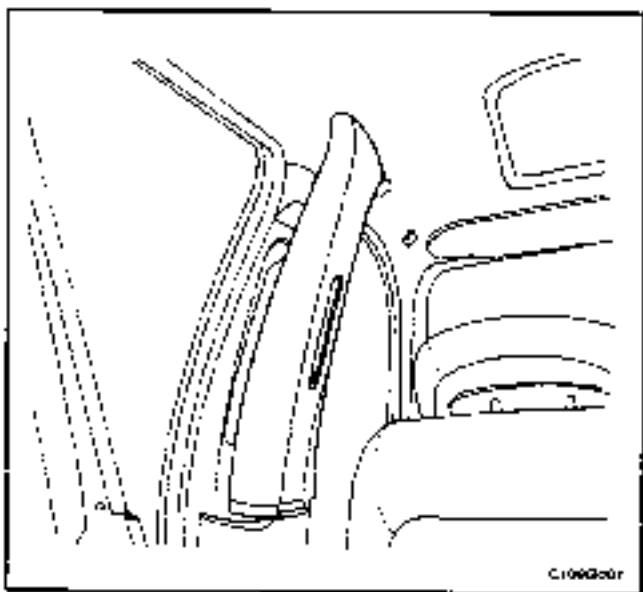
## UPPER B-PILLAR TRIM PANEL

### Removal Procedure

1. Remove the bolt and the upper front seat belt anchor.

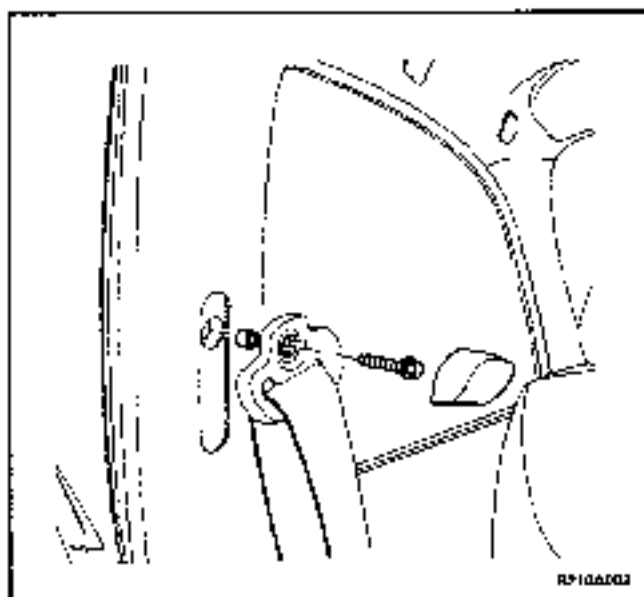


2. Reposition the upper portion of the lower B-pillar trim panel.
3. Pry off the upper B-pillar trim panel.



### Installation Procedure

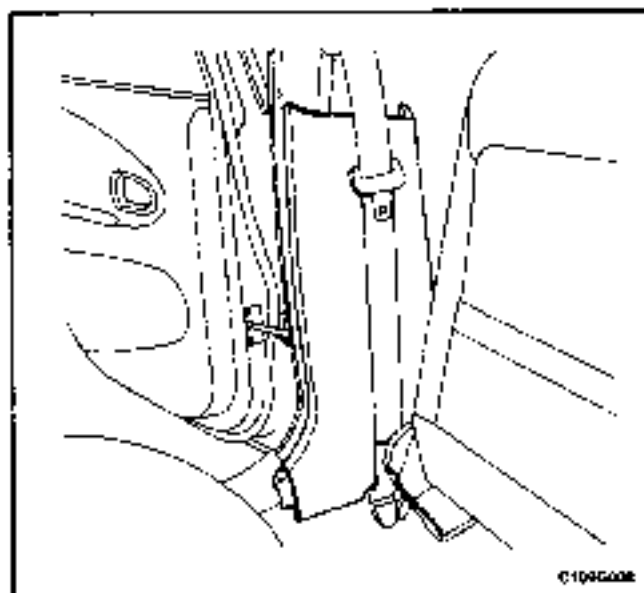
1. Install the upper B-pillar trim panel.



- 2 Install the upper portion of the lower B-pillar trim panel to its original position.
- 3 Install the upper front seat belt anchor with the bolt.

**Tighten**

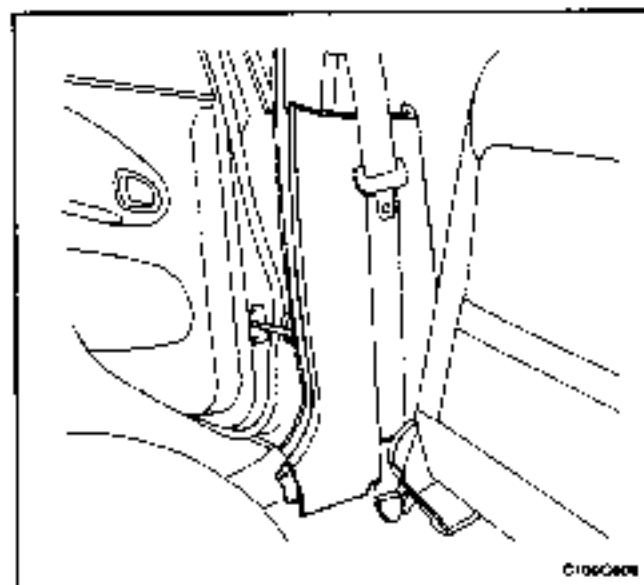
Tighten the seat belt anchor bolt to 37 N·m (27 lb-ft).



**LOWER B-PILLAR TRIM PANEL**

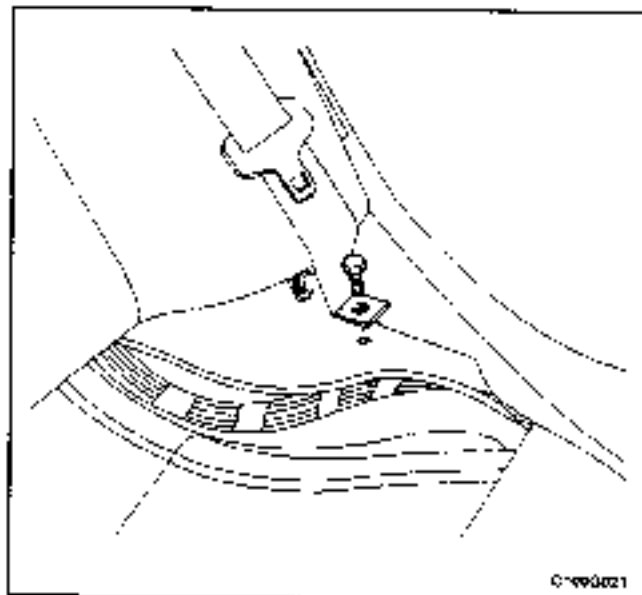
**Removal Procedure**

1. Reposition the rear portion of the front rocker trim panel and the front portion of the rear rocker trim panel.
2. Remove the lower B-pillar trim panel.



**Installation Procedure**

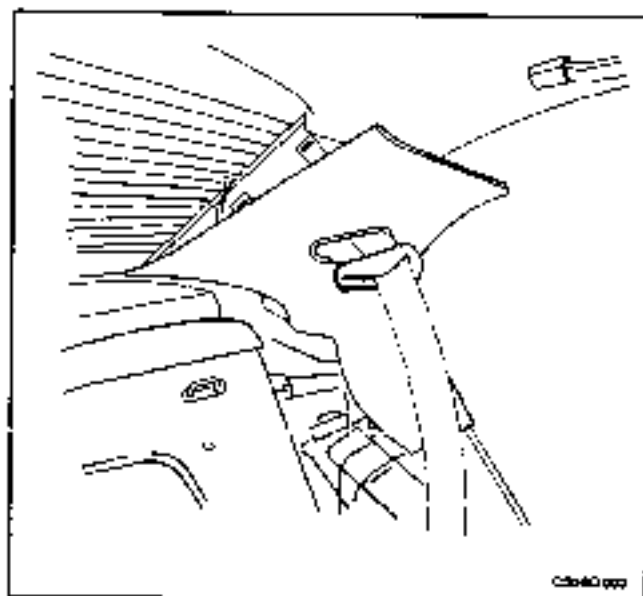
1. Install the lower B-pillar trim panel.
2. Install the front rocker trim panel and the rear rocker trim panel to their original positions.



## C-PILLAR TRIM PANEL

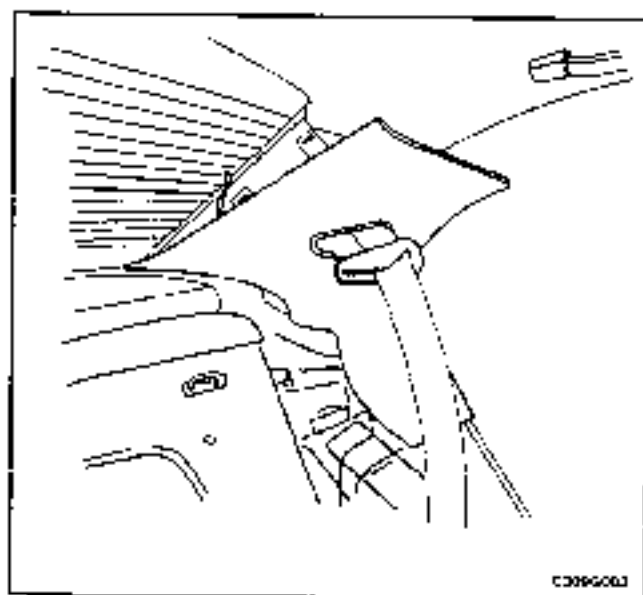
### Removal Procedure

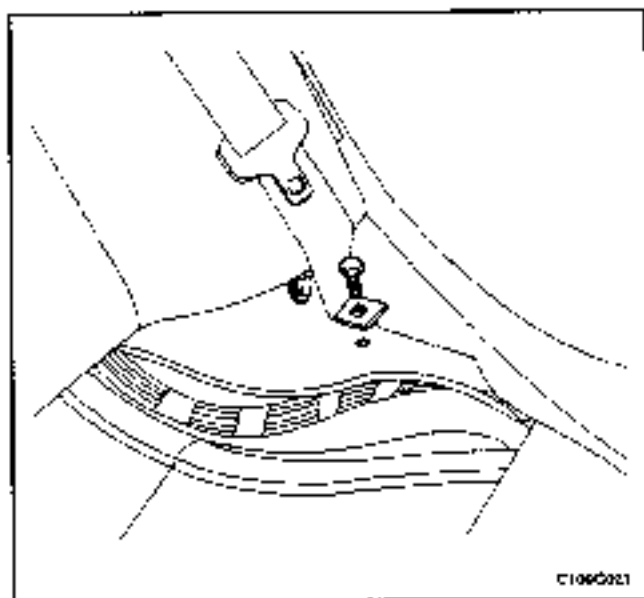
1. Remove the bolt and the rear seat belt floor anchor.
2. Remove the rear seat side bolster cushion. Refer to *Section 9H, Seats*.
3. Pry off the C-pillar trim panel from the body.
4. Remove the seat belt trim piece.
5. Remove the C-pillar trim panel from the seat belt.



### Installation Procedure

1. Feed the seat belt through the C-pillar trim panel.
2. Install the seat belt trim piece.
3. Install the C-pillar trim panel.

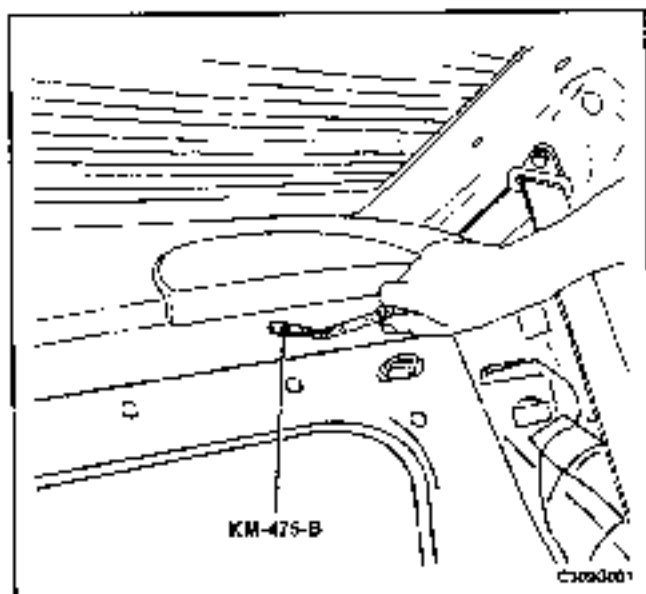




4. Install the rear seat side bolster cushion. Refer to Section 9H, Seats.
5. Install the rear seat belt floor anchor with the bolt

**Tighten**

Tighten the seat belt anchor bolt to 37 N•m (27 lb-ft).



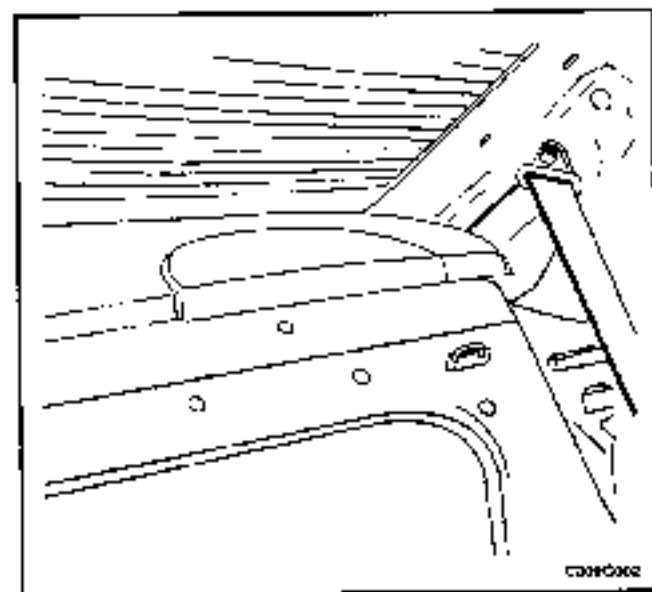
**DECK LID SILL PLATE COVER**

**Tools Required**

KM-475-B Trim Remover

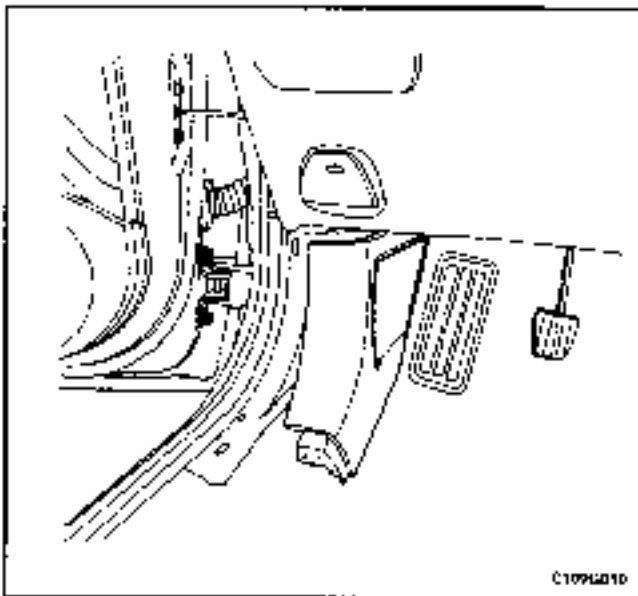
**Removal Procedure**

1. Remove the rear seat side bolster cushion. Refer to Section 9H, Seats.
2. Lower the rear seatback.
3. Remove the left side C-pillar trim panel.
4. Remove the plastic retaining clips and the rear deck lid sill plate cover using the trim remover KM-475-B.



**Installation Procedure**

1. Install the rear deck lid sill plate cover with the plastic retaining clips.
2. Install the left side C-pillar trim panel.
3. Install the rear seat side bolster cushion. Refer to Section 9H, Seats.

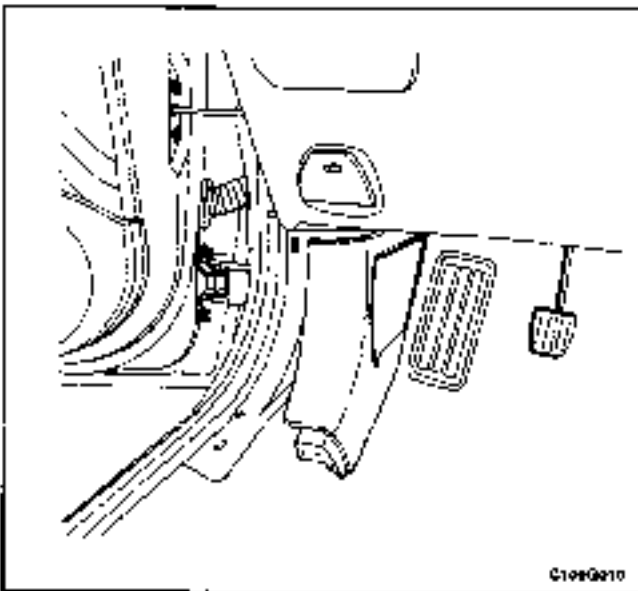


## KICK PANEL

(Left-Hand Drive Shown, Right-Hand Drive Similar)

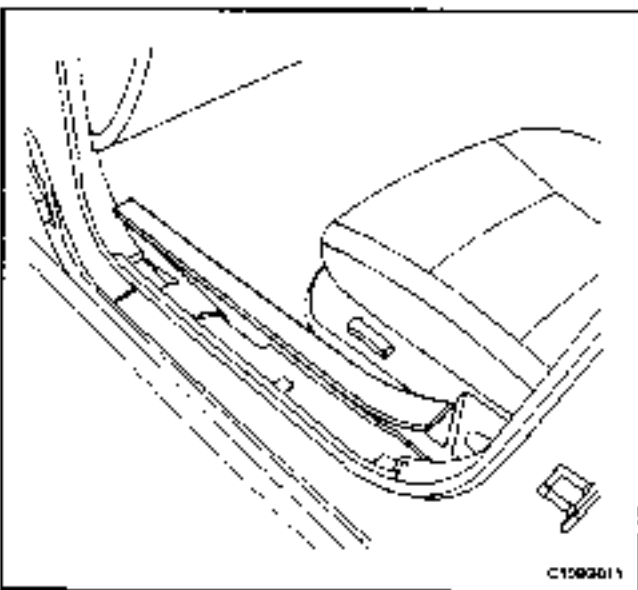
### Removal Procedure

1. Remove the front rocker trim panel
2. Remove the kick panel



### Installation Procedure

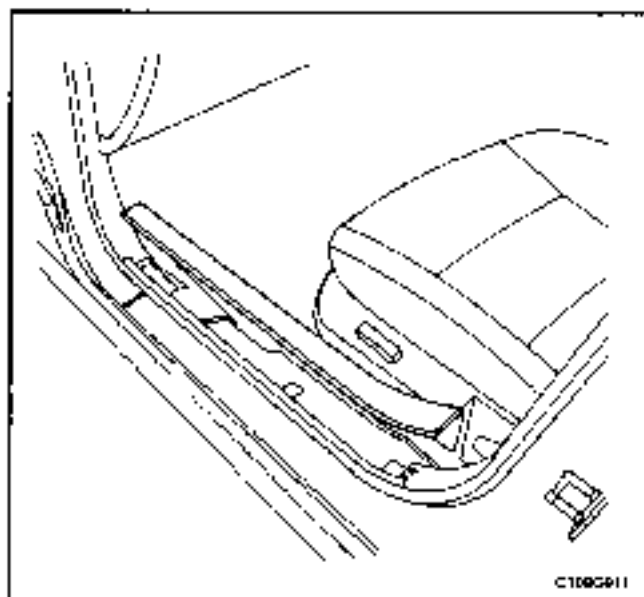
1. Install the kick panel.
2. Install the front rocker trim panel



## FRONT ROCKER TRIM PANEL

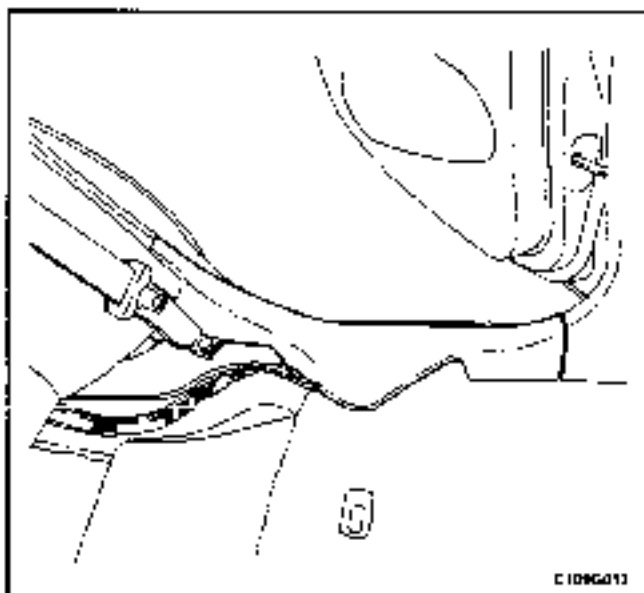
### Removal Procedure

1. Remove the front rocker trim panel.



### Installation Procedure

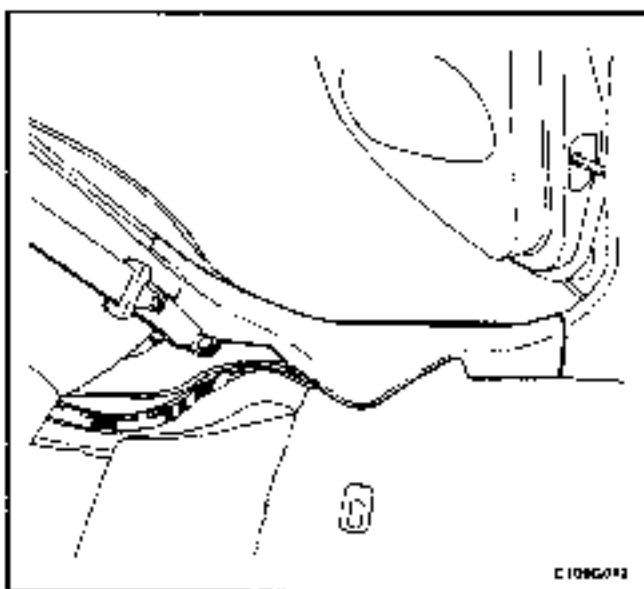
1. Install the front rocker trim panel.



### REAR ROCKER TRIM PANEL

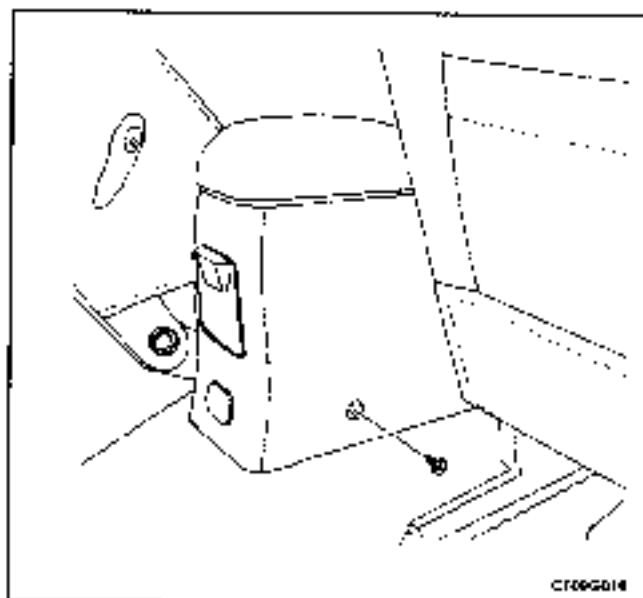
#### Removal Procedure

1. Reposition the rear seat cushion.
2. Remove the rear rocker trim panel.



#### Installation Procedure

1. Install the rear rocker trim panel.
2. Install the rear seat cushion to its original position.



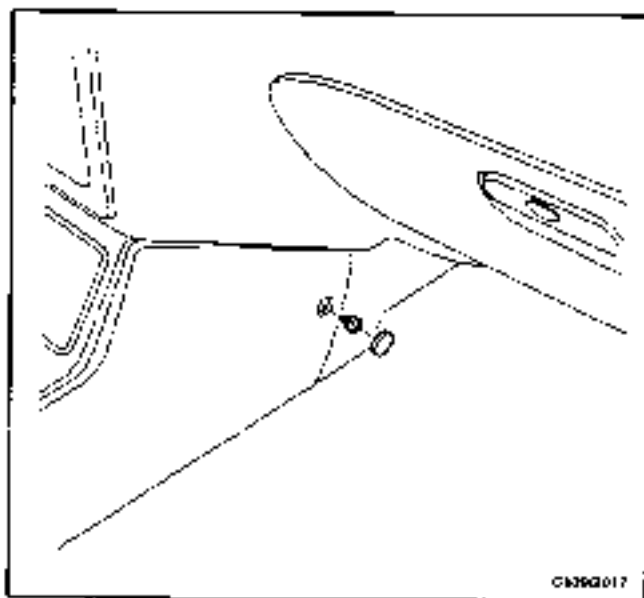
C106016

## FLOOR CONSOLE

(Left-Hand Drive Shown, Right-Hand Drive Similar)

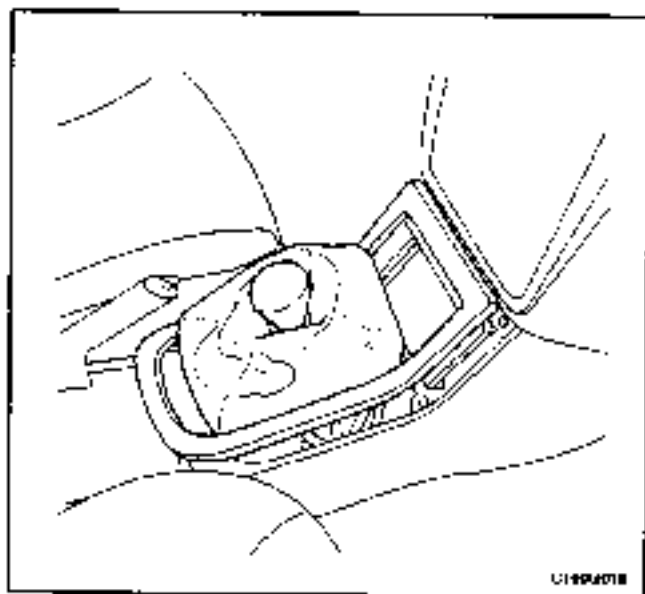
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the screws from the rear portion of the floor console.



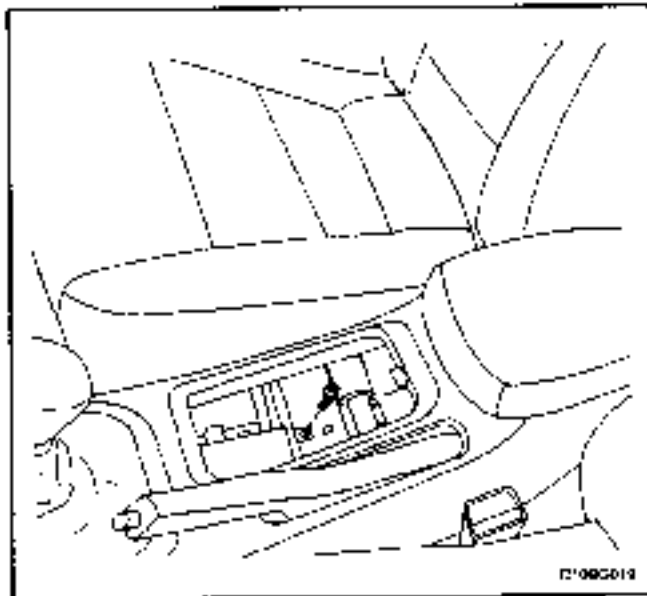
C106017

3. Remove the cupholder. Refer to "Cupholder" in this section.
4. Remove the screws from the front portion of the floor console.

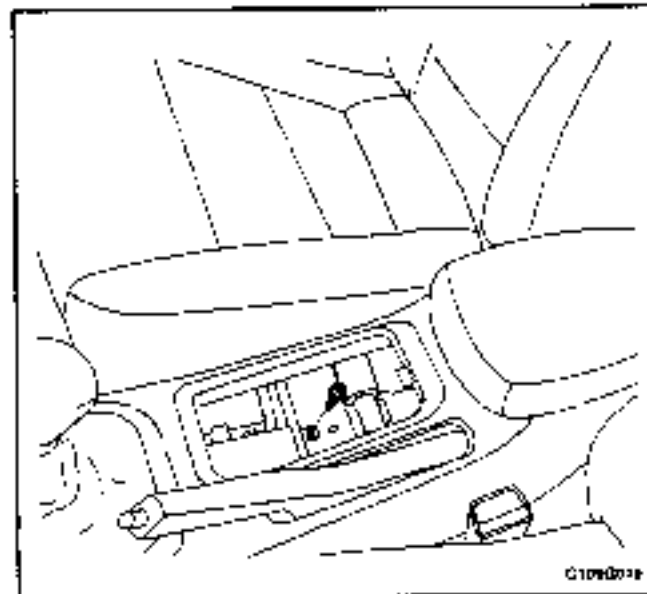


C106018

5. Remove the shift lever knob (if equipped)
6. Remove the shift lever trim panel.



7. Remove the console-to-parking brake assembly screw.
8. Remove the floor console.
9. Disconnect the ashtray and cigar lighter electrical connector.

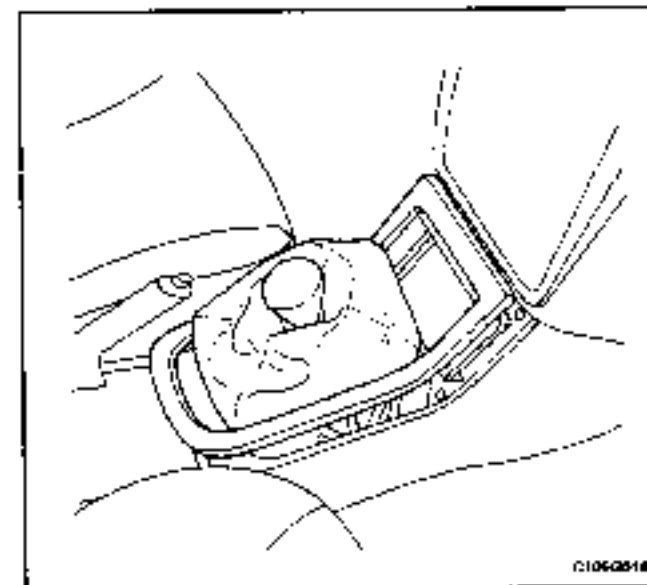


### Installation Procedure

1. Connect the ashtray and cigar lighter electrical connector.
2. Install the floor console.
3. Install the console-to-parking brake assembly screw.

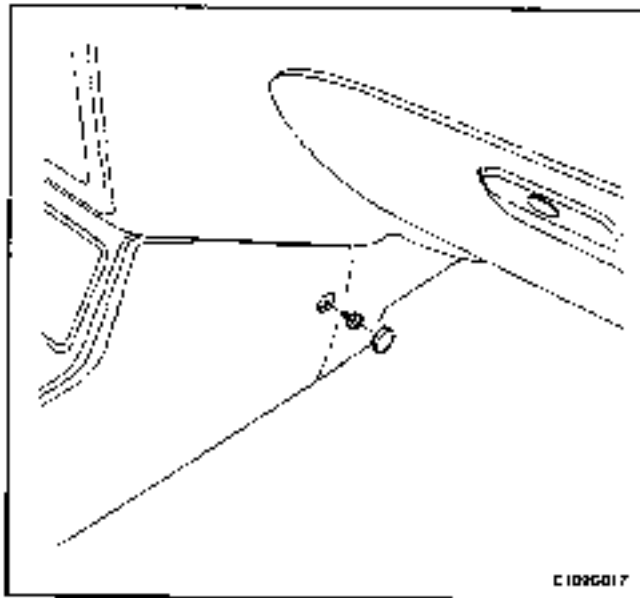
### Tighten

Tighten the console-to-parking brake assembly screw to 4 N·m (35 lb-in).



4. Install the shift lever trim panel.
5. Install the shift lever boot (if equipped).

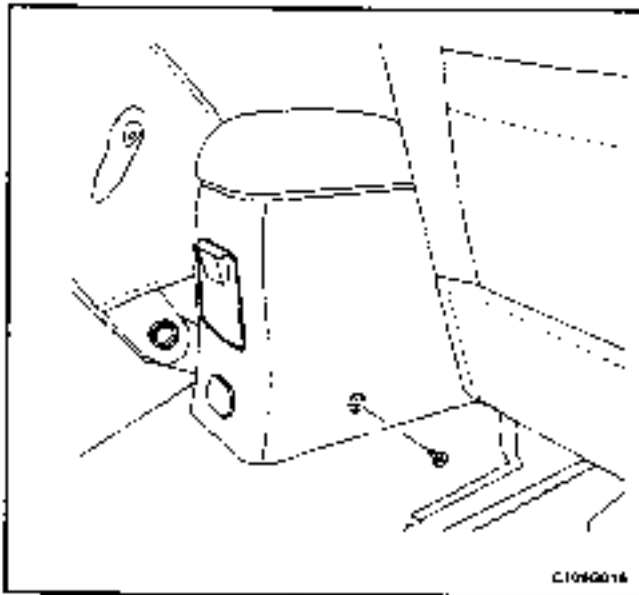




6. Install the screws into the front portion of the floor console.

**Tighten**

Tighten the floor console screws to 2.5 N·m (22 lb-in).



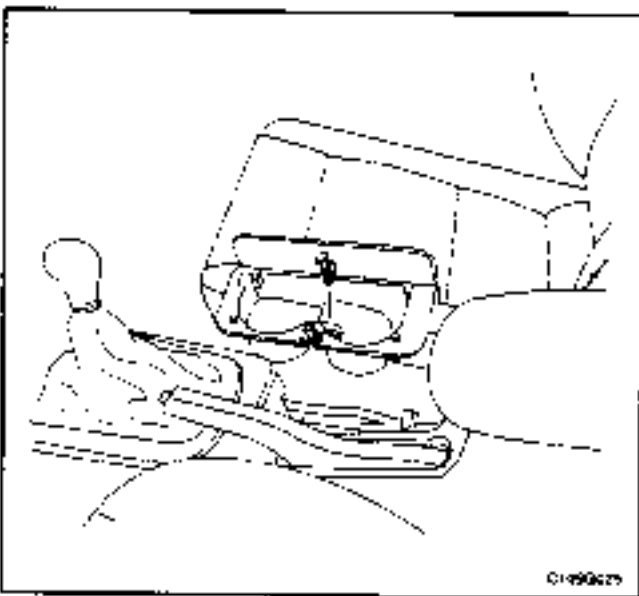
7. Install the cupholder. Refer to "Cupholder" in this section.

8. Install the rear portion of the floor console with the screws.

**Tighten**

Tighten the floor console screws to 2.5 N·m (22 lb-in).

9. Connect the negative battery cable.

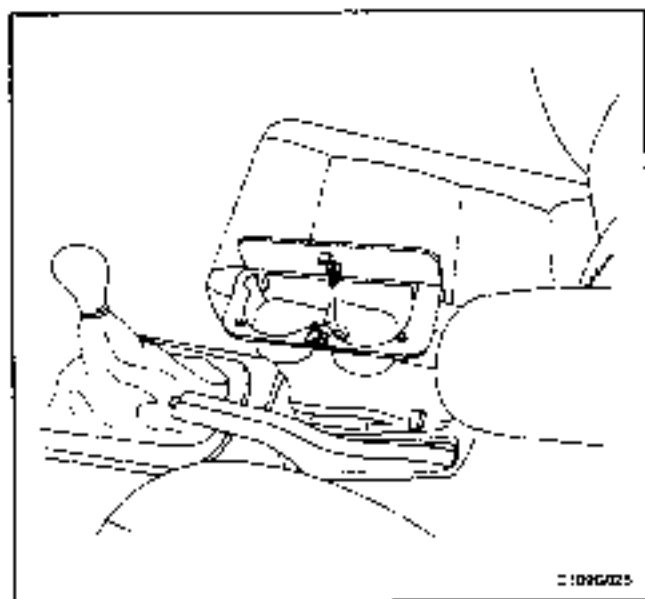


**CUPHOLDER**

(Left-Hand Drive Shown, Right-Hand Drive Similar)

**Removal Procedure**

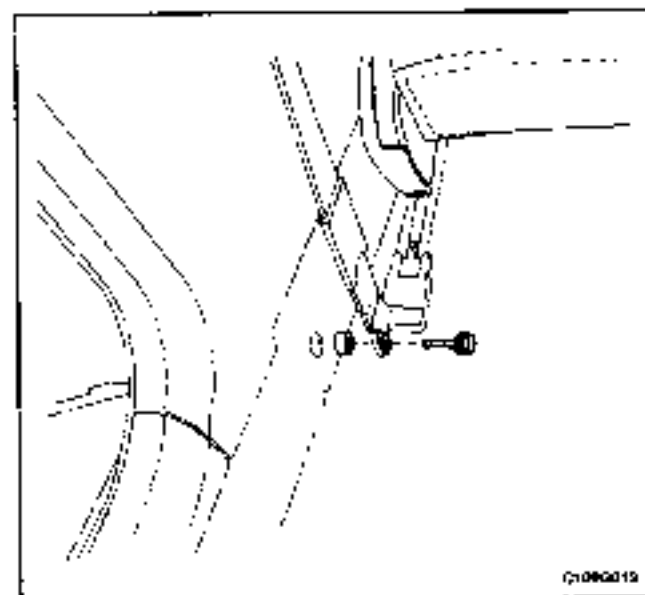
1. Remove the screw and the cupholder.



1. Install the cupholder with the screw

### Tighten

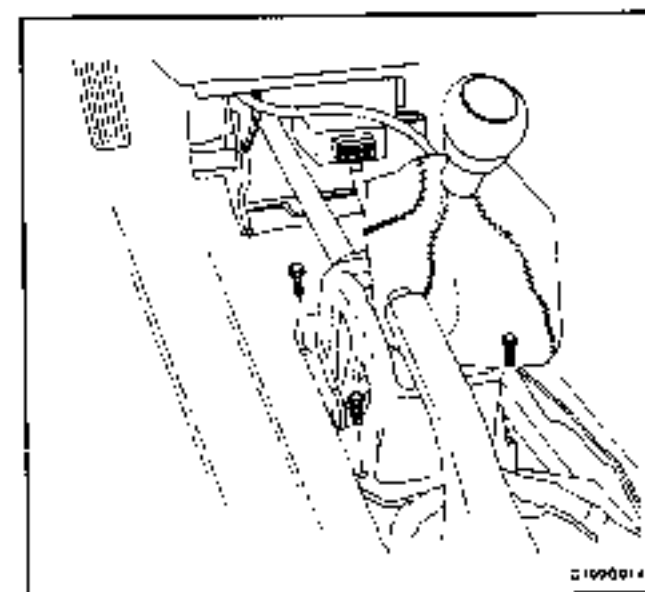
Tighten the cupholder screw to 2.5 N•m (22 lb-in).

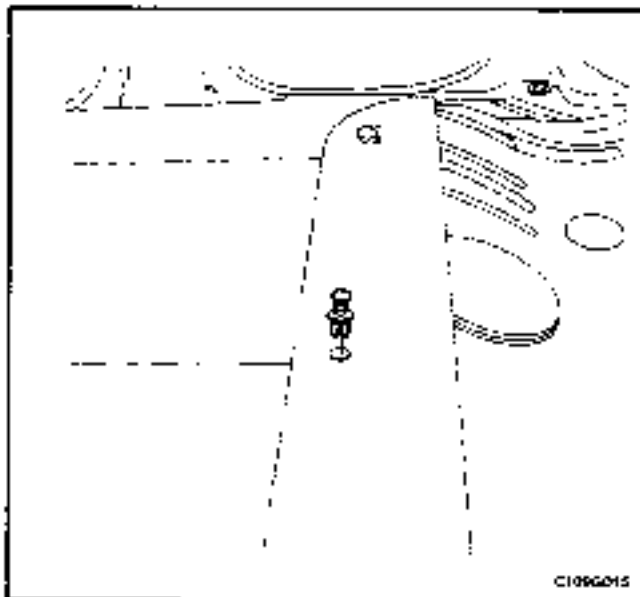


## FLOOR CARPET

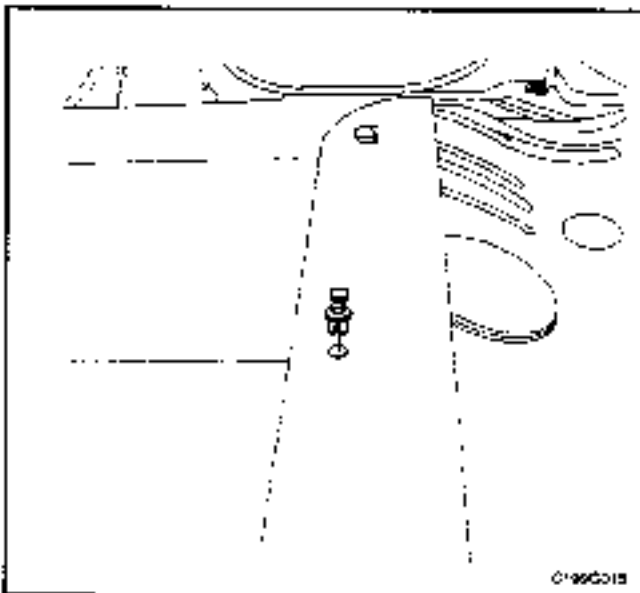
### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion. Refer to Section 9H, Seats.
3. Remove the left and the right rear rocker trim panels. Refer to "Rear Rocker Trim Panel" in this section.
4. Remove the bolts and the left and the right lower front seat belt anchors from the B-pillar.
5. Remove the left and the right front rocker trim panels.
6. Remove the left and the right lower B-pillar trim panels. Refer to "Lower B-Pillar Trim Panel" in this section.
7. Remove the front seats. Refer to Section 9H, Seats.
8. Remove the left and the right kick panels. Refer to "Kick Panel" in this section.
9. Remove the floor console. Refer to "Floor Console" in this section.
10. Remove the gearshift housing bolts and reposition the gearshift housing.



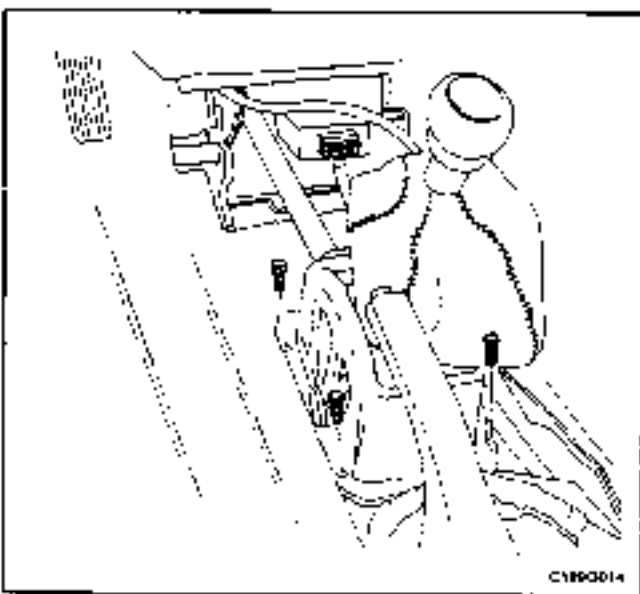


11. Remove the floor carpet retaining clips.
12. Remove the floor carpet.



**Installation Procedure**

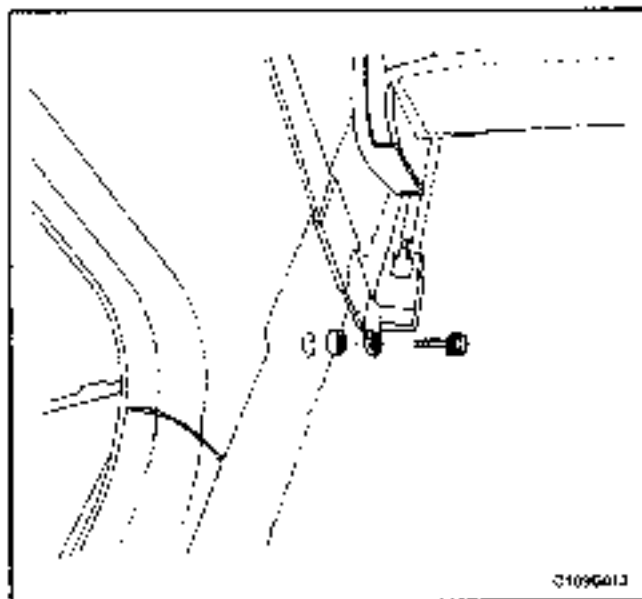
1. Install the floor carpet
2. Install the floor carpet retaining clips.



3. Install the gearshift housing with the bolts.

**Tighten**

Tighten the gearshift housing bolts to 7 N•m (62 lb-in).



4. Install the floor console. Refer to 'Floor Console' in this section.
5. Install the left and the right kick panels. Refer to 'Kick Panel' in this section.
6. Install the front seats. Refer to *Section 9H, Seats*.
7. Install the left and the right lower B-pillar trim panels. Refer to 'Lower B-Pillar Trim Panel' in this section.
8. Install the left and the right front rocker trim panels.
9. Install the left and the right lower front seat belt anchors to the B-pillar with the bolts.

**Tighten**

Tighten the seat belt anchor bolts to 37 N•m (27 lb-ft).

10. Install the left and the right rear rocker trim panels. Refer to 'Rear Rocker Trim Panel' in this section.
11. Install the rear seat cushion. Refer to *Section 9H, Seats*.
12. Connect the negative battery cable.

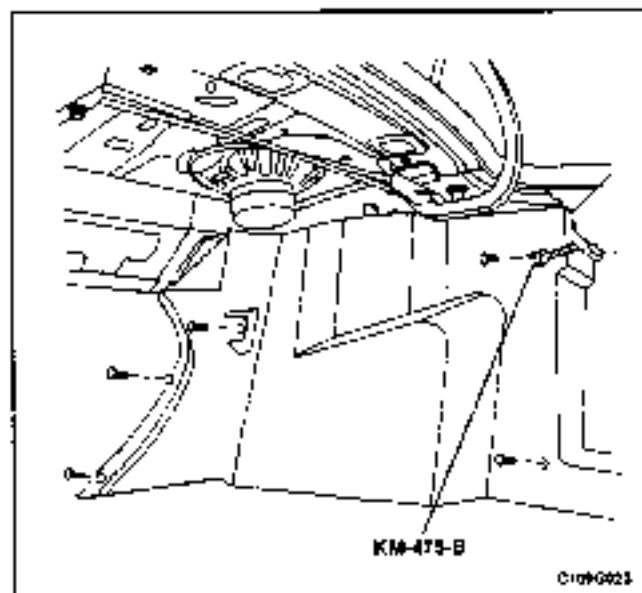
**LUGGAGE COMPARTMENT  
WHEELHOUSE TRIM PANEL**

**Tools Required**

KM-475-B Trim Remover

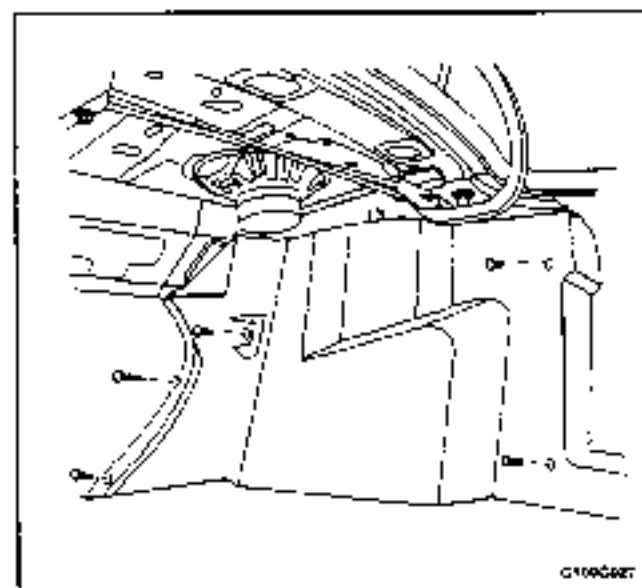
**Removal Procedure**

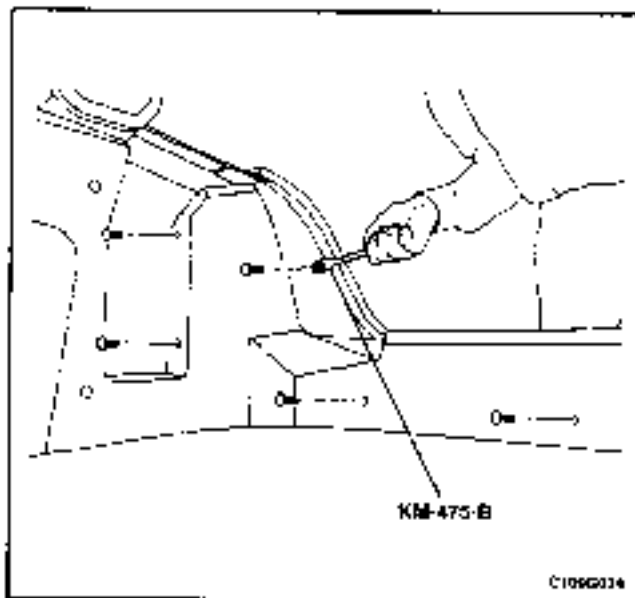
1. Remove the plastic retaining clips using the trim remover KM-475-B and reposition the luggage compartment rear trim panel.
2. Remove the plastic retaining clips and the wheelhouse trim panel.



**Installation Procedure**

1. Install the wheelhouse trim panel with the plastic retaining clips.
2. Install the luggage compartment rear trim panel to its original position.
3. Secure the luggage compartment rear trim panel with the plastic retaining clips.





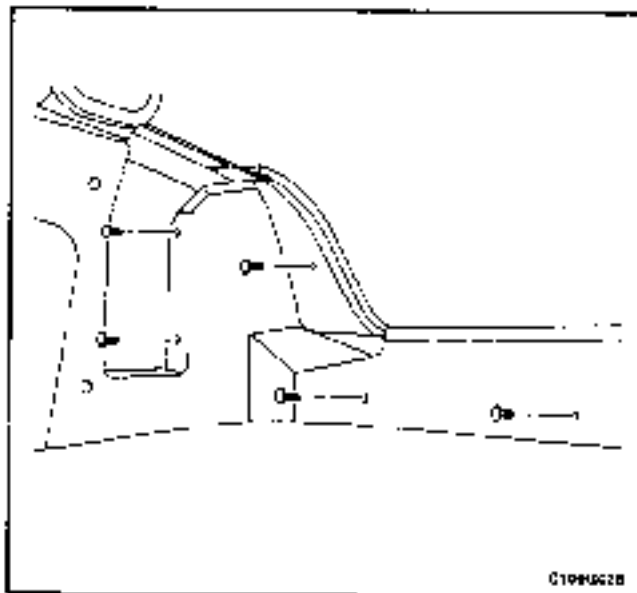
## LUGGAGE COMPARTMENT REAR TRIM PANEL

### Tools Required

KM-475-B Trim Remover

### Removal Procedure

1. Remove the protective trim cover using the trim remover KM-475-B.
2. Remove the plastic retaining clips and the rear trim panel.



### Installation Procedure

1. Install the rear trim panel with the plastic retaining clips.
2. Install the protective trim cover.

## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **INTERIOR TRIM PANELS**

The interior trim panels are molded plastic and fasten with screws or plastic clips.

### **PRESSURE RELIEF VENT**

When all the windows are closed and the ventilation system is on, the addition of outside air to the interior of the vehicle causes a positive pressure within the vehicle. In order to relieve the pressure, air is released through a pressure relief vent. The pressure relief vents are located at the rear quarter of the vehicle, behind the bumper fascia.

### **FLOOR CONSOLE**

The floor console fits over the tunnel in the floor of the vehicle and extends from under the center of the instrument panel to the rear seat area. The front portion of the console contains the cigar lighter and the transaxle shift lever. The rear portion of the console contains the parking brake lever, a cupholder, a storage compartment, and an ashtray for the rear seat occupants.

The sensing and diagnostic module (SDM) for the airbag system and the remote keyless entry module are located under the console.

### **FLOOR CARPET**

The one-piece floor carpet goes over both the front and the rear floor pans.

# SECTION 9H SEATS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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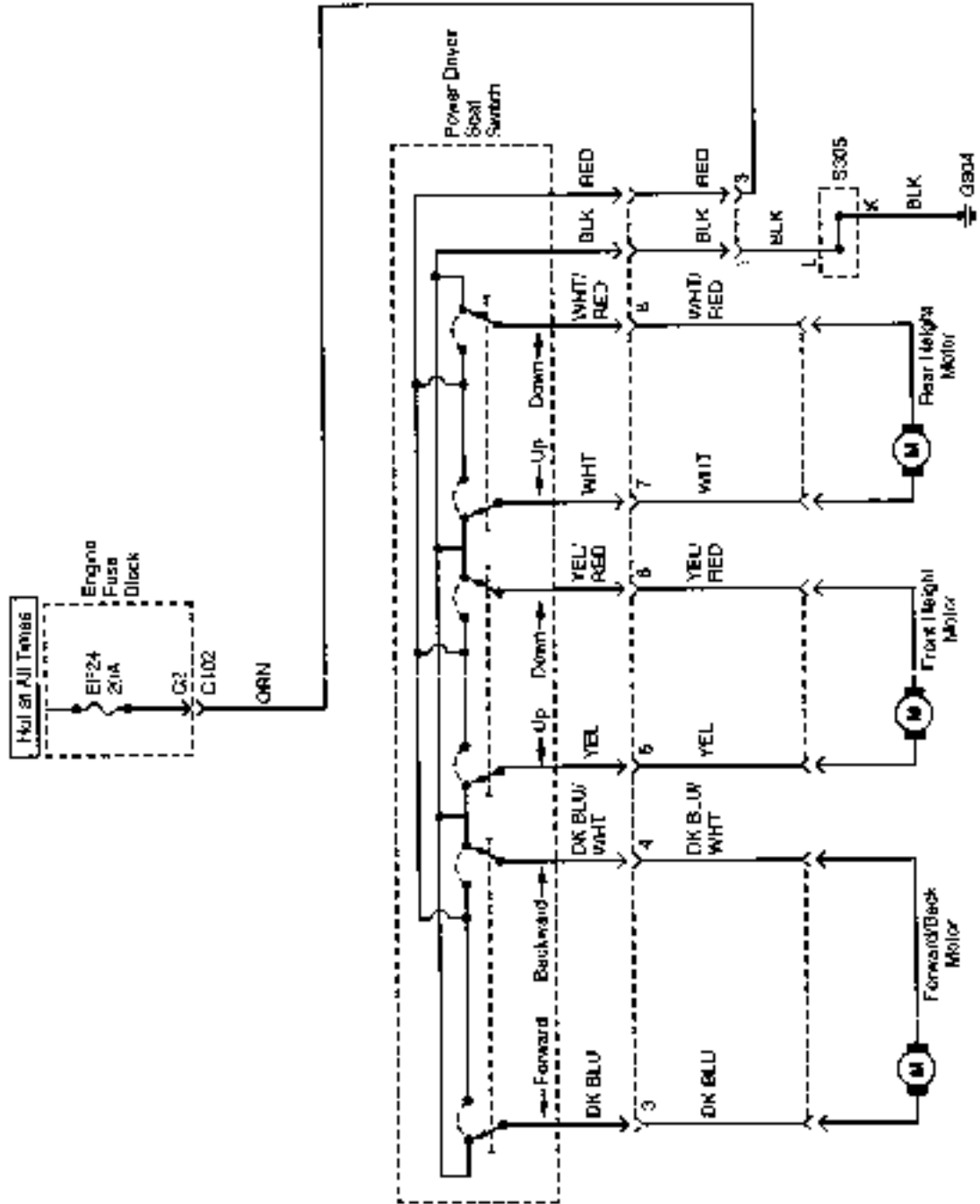
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Armrest Nuts	12	-	106
Front Seatback Bolts	45	33	-
Front Seat Cover Screws	12	-	106
Front Seat Cushion Bolts	12	-	106
Front Seat Trim Screws	12	-	106
Front Seat-to-Floor Bolts	25	18	-
Height Adjustment Knob Screw	2	-	18
Lumbar Support Lever Screw	10	-	89
Rear Seatback Bolts	25	18	-
Rear Seatback Lock Striker Bolts	25	18	-
Rear Seatback Nuts	25	18	-
Rear Seat Hinge Bolts	12	-	106
Rear Seat Side Bolster Cushion Bolt	25	18	-
Seat Recliner Lever Screw	12	-	106
Slide Assembly Bolts	25	18	-
Slide Assembly Nuts	15	11	-
Slide Assembly Screws	10	-	89
Tilt Motor Bolts	13	-	115

# SCHEMATIC AND ROUTING DIAGRAMS

## POWER DRIVER SEAT CIRCUIT



CS084334



## DIAGNOSIS

### POWER DRIVER SEAT

**Caution:** If the driver seat motor is powered directly from a battery, personal injury could be caused by sparking and sudden heating of the terminals if the wires from the battery are touched together. Use a fused jumper wire, and use terminal test adapters if available. If terminal test adapters are not available, use insulating tape to reduce the possibility of touching the jumpers together.

#### Diagnostic Aids

If resistance is measured between the terminals of the motor connectors, the frontward/backward motor resistance is approximately equal to 1  $\Omega$ . The front height mo-

tor resistance is approximately equal to 5  $\Omega$ , and the rear height motor resistance is approximately equal to 9  $\Omega$ .

#### Power Driver Seat Does Not Work

Step	Action	Value(s)	Yes	No
1	Visually and physically check for proper connections at the following connectors: <ul style="list-style-type: none"> <li>• The four-pin connector under the driver seat.</li> <li>• The connector to the power driver seat switch.</li> </ul> Were the connectors firmly attached?	-	Go to Step 3	Go to Step 2
2	1. Properly connect the connectors. 2. Attempt to adjust the power driver seat. Does the power driver seat work after the connectors were correctly attached?	-	System OK	Go to Step 3
3	Attempt to adjust the power driver seat in each of the three directions: frontward/backward, front height, rear height. Does the seat adjust in any direction?	-	Go to Step 8	Go to Step 4
4	1. Disconnect the four-pin connector from the body wiring harness which is found under the driver seat. 2. Turn the ignition ON. 3. Check the voltage at the ORN wire and the body harness side of the four-pin connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 6	Go to Step 5
5	Repair the power supply to the ORN wire and fuse EF24. Is the repair complete?	-	System OK	-
6	Use an ohmmeter to check the resistance between ground and the BLK wire at the disconnected four-pin connector, body harness side. Is the resistance equal to the specified value?	= 0 $\Omega$	Go to Step 8	Go to Step 7
7	Repair the open BLK wire between ground and the four-pin body harness connector under the driver seat. Is the repair complete?	-	System OK	-
8	Attempt to adjust the power driver seat forward and backward. Does the power driver seat move forward and backward?	-	Go to Step 14	Go to Step 9

## Power Driver Seat Does Not Work (Cont'd)

Step	Action	Value(s)	Yes	No
9	<ol style="list-style-type: none"> <li>1. Disconnect the power driver seat switch electrical connector.</li> <li>2. Move a vehicle battery near enough to the power driver seat switch so that jumper wires can reach from the battery to the switch.</li> <li>3. Connect a jumper wire between the test battery negative terminal and the DK BLU wire at terminal 3 on the motor side of the power driver seat switch.</li> <li>4. Carefully connect a fused jumper wire between the test battery positive terminal and the DK BLU/WHT wire at terminal 4 on the motor side of the power driver seat switch. The two terminals are close together, and the motor may have a short circuit, so a fused jumper wire is recommended. Do not allow the wires from the battery to touch each other. If the motor is okay and it is not at the end of its travel, the power driver seat should move.</li> <li>5. To enable the motor to operate in the opposite direction, carefully reverse the battery connections between DK BLU and DK BLU/WHT.</li> </ol> <p>Does the motor run backward and forward when the motor was directly powered by a vehicle battery?</p>	-	Go to Step 10	Go to Step 11
10	<ol style="list-style-type: none"> <li>1. Replace the power driver seat switch.</li> <li>2. The power driver seat switch can be installed backward, so test the switch to verify that it is installed correctly before reinstalling the front power driver seat trim and switch.</li> <li>3. Install the front power driver seat trim.</li> </ol> <p>Is the repair complete?</p>	-	System OK	-
11	<ol style="list-style-type: none"> <li>1. Disconnect the two-pin connector that joins the DK BLU and DK BLU/WHT wires from the power driver seat switch to the forward/backward motor.</li> <li>2. Use an ohmmeter to check the resistance of the DK BLU and DK BLU/WHT wires between the power driver seat switch connector and the forward/backward motor connector.</li> </ol> <p>Is the resistance of each wire equal to the specified value?</p>	$\approx 0 \Omega$	Go to Step 13	Go to Step 12
12	<p>Repair the open circuit in the DK BLU wire or the DK BLU/WHT wire.</p> <p>Is the repair complete?</p>	-	System OK	-
13	<p>Replace the power driver seat motor assembly.</p> <p>Is the repair complete?</p>	-	System OK	-
14	<p>Attempt to adjust the power driver seat front height.</p> <p>Does the front height adjustment work?</p>	-	Go to Step 18	Go to Step 15

## Power Driver Seat Does Not Work (Cont'd)

Step	Action	Value(s)	Yes	No
15	<ol style="list-style-type: none"> <li>1. Disconnect the power driver seat switch electrical connector.</li> <li>2. Move a vehicle battery near enough to the power driver seat switch so that jumper wires can reach from the battery to the switch.</li> <li>3. Connect a jumper wire between the test battery negative terminal and the YEL wire at terminal 5 on the motor side of the power driver seat switch.</li> <li>4. Carefully connect a fused jumper wire between the test battery positive terminal and the YEL/RED wire at terminal 6 on the motor side of the power driver seat switch. The two terminals are close together, and the motor may have a short circuit, so a fused jumper wire is recommended. Do not allow the wires from the battery to touch each other. If the motor is good and it is not at the end of its travel, the power driver seat should move.</li> <li>5. To enable the motor to operate in the opposite direction, carefully reverse the battery connections between YEL and YEL/RED.</li> </ol> <p>Did the height adjust up and down when the motor was directly powered by a vehicle battery?</p>	-	Go to Step 10	Go to Step 16
16	<ol style="list-style-type: none"> <li>1. Disconnect the two-pin connector that joins the YEL and YEL/RED wires from the power driver seat switch to the front height motor.</li> <li>2. Use an ohmmeter to check the resistance of the YEL and YEL/RED wires between the power driver seat switch connector and the front height motor connector.</li> </ol> <p>Is the resistance of each wire equal to the specified value?</p>	= 0 Ω	Go to Step 13	Go to Step 17
17	<p>Repair the open circuit in the YEL wire or the YEL/RED wire.</p> <p>Is the repair complete?</p>	-	System OK	-
18	<p>Attempt to adjust the power driver seat rear height.</p> <p>Does the rear height adjustment work?</p>	-	System OK	Go to Step 19

## Power Driver Seat Does Not Work (Cont'd)

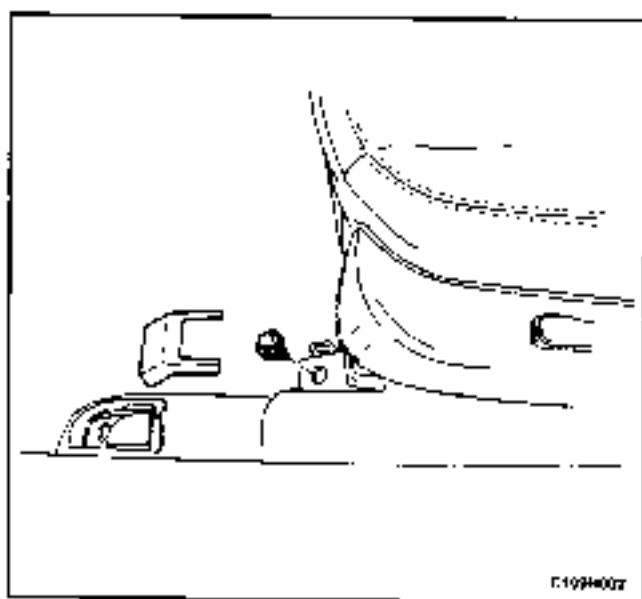
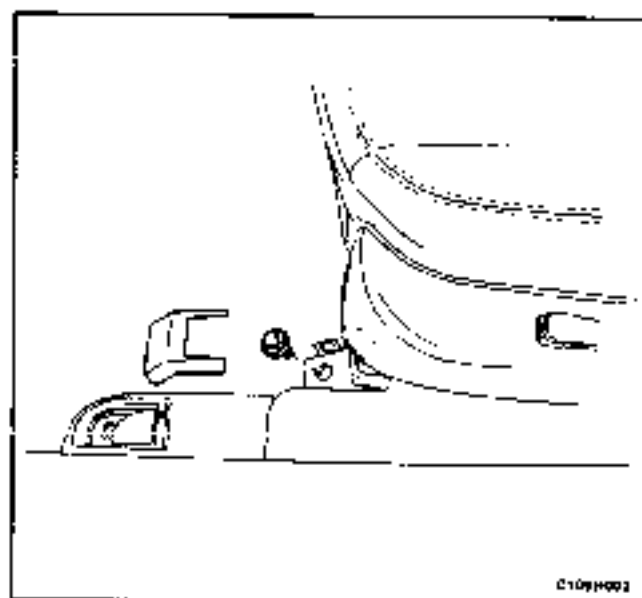
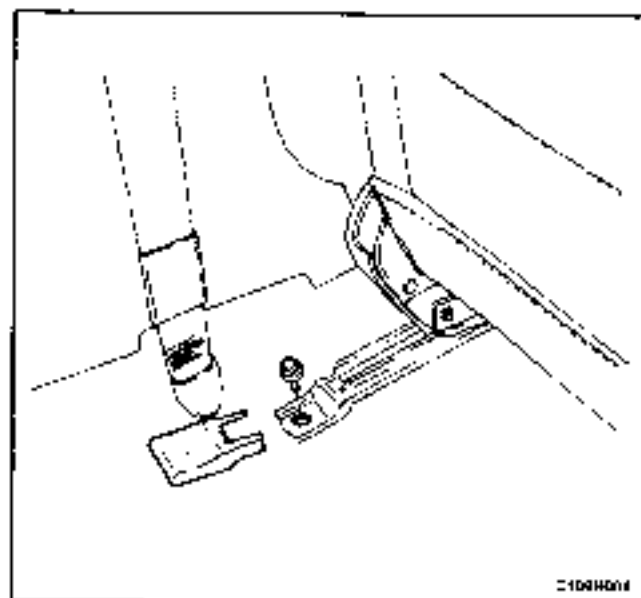
Step	Action	Value(s)	Yes	No
19	<ol style="list-style-type: none"> <li>1. Disconnect the power driver seat switch electrical connector.</li> <li>2. Move a vehicle battery near enough to the power driver seat switch so that jumper wires can reach from the battery to the switch.</li> <li>3. Connect a jumper wire between the test battery negative terminal and the WHT wire at terminal 7 on the motor side of the power driver seat switch.</li> <li>4. Carefully connect a fused jumper wire between the test battery positive terminal the WHT/RED wire at terminal 6 on the motor side of the power driver seat switch. The two terminals are close together, and the motor may have a short circuit, so a fused jumper wire is recommended. Do not allow the wires from the battery to touch each other. If the motor is good and it is not at the end of its travel, the power driver seat should move.</li> <li>5. To enable the motor to operate in the opposite direction, carefully reverse the battery connections between WHT and WHT/RED.</li> </ol> <p>Did the height adjust up and down when the motor was directly powered by a vehicle battery?</p>	-	Go to Step 10	Go to Step 20
20	<ol style="list-style-type: none"> <li>1. Disconnect the two-pin connector that joins the WHT and WHT/RED wires from the power driver seat switch to the front height motor.</li> <li>2. Use an ohmmeter to check the resistance of the WHT and WHT/RED wires between the power driver seat switch connector and the front height motor connector.</li> </ol> <p>Is the resistance of each wire equal to the specified value?</p>	> 0 Ω	Go to Step 10	Go to Step 21
21	<p>Repair the open circuit in the WHT wire or the WHT/RED wire.</p> <p>Is the repair complete?</p>	-	System OK	-

**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****FRONT BUCKET SEAT**

(Left-Hand Drive Shown, Right-Hand Drive Similar)

**Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the plastic caps and the bolts securing the rear portion of the front seat to the floor.
3. Remove the plastic caps and the bolts securing the front portion of the front seat to the floor (power driver seat shown, manual driver seat similar).
4. Disconnect the electrical connectors.
5. Remove the seat.

**Installation Procedure**

1. Install the seat.
2. Connect the electrical connectors.

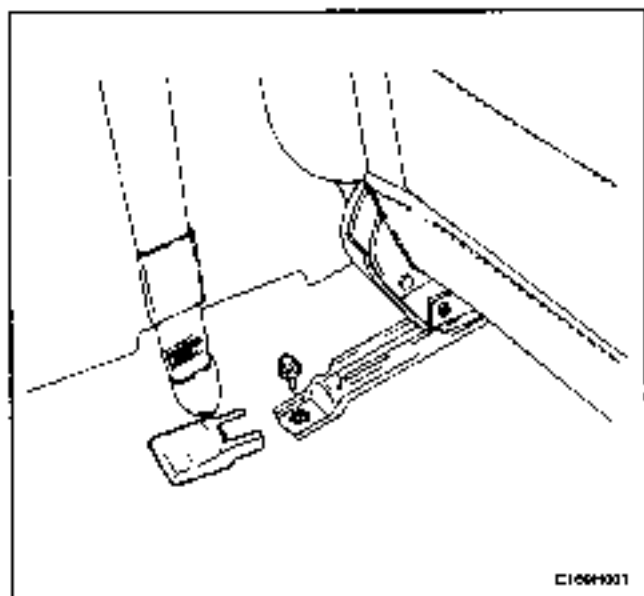
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the bolts into the front portion of the front seat (power driver seat shown, manual driver seat similar).

**Tighten**

Tighten the front seat-to-floor bolts to 25 N·m (18 lb-ft).

4. Install the plastic caps.



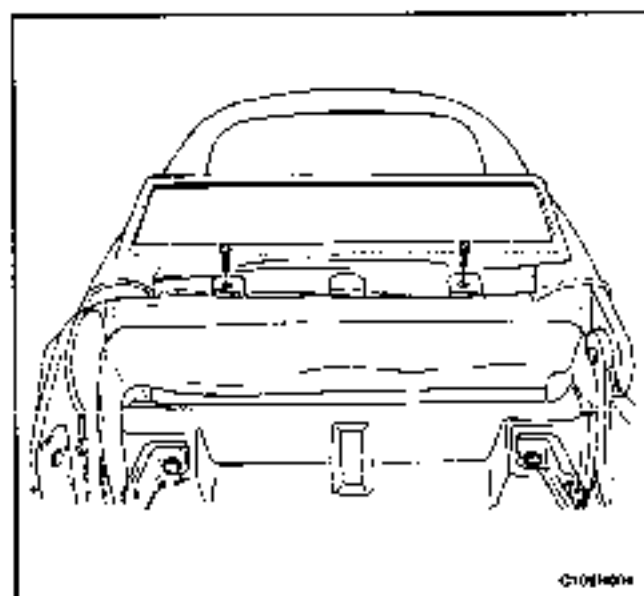
5. Install the bolts into the rear portion of the front seat.

**Tighten**

Tighten the front seat-to-floor bolts to 25 N·m (18 lb·ft).

6. Install the plastic caps.

7. Connect the negative battery cable

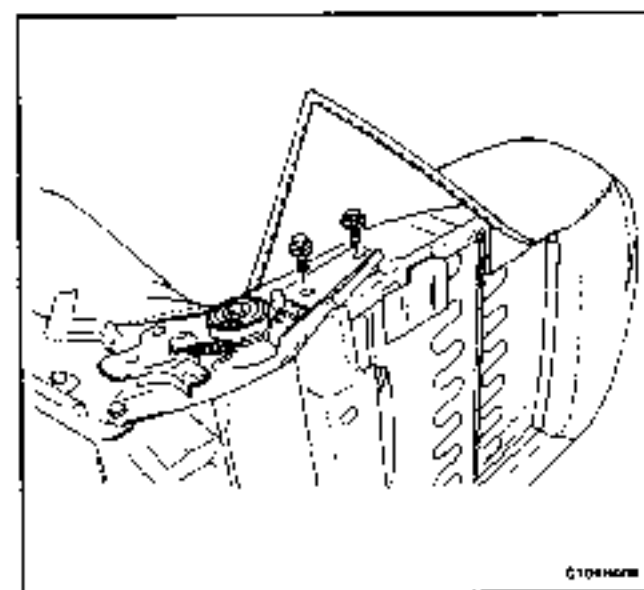


**FRONT SEATBACK**

**Removal Procedure**

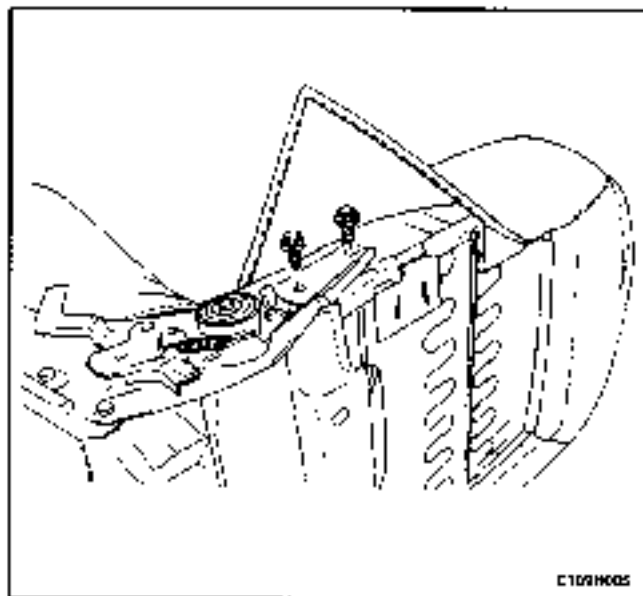
1. Remove the front bucket seat from the vehicle. Refer to "Front Bucket Seats" in this section.

2. Remove the screws and slide the back panel down to remove.



3. Reposition the left side seatback cover

4. Remove the bolts and the seatback.



### Installation Procedure

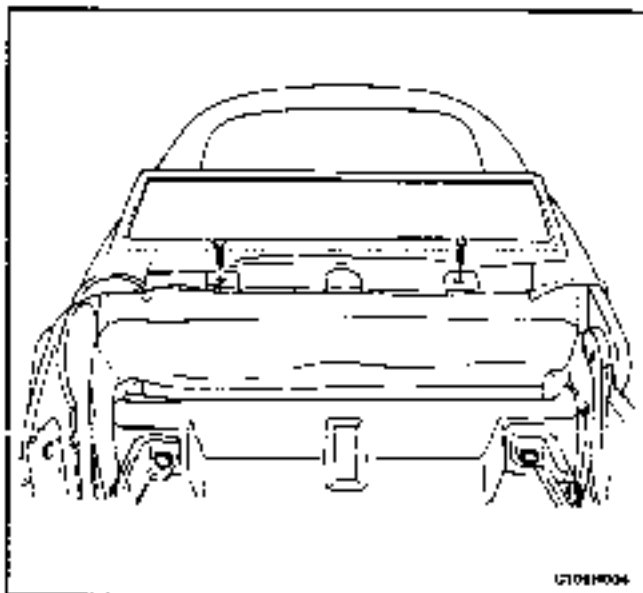
1. Install the seatback onto the seat cushion.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the front seatback bolts.

#### Tighten

Tighten the front seatback bolts to 45 N•m (33 lb-ft).



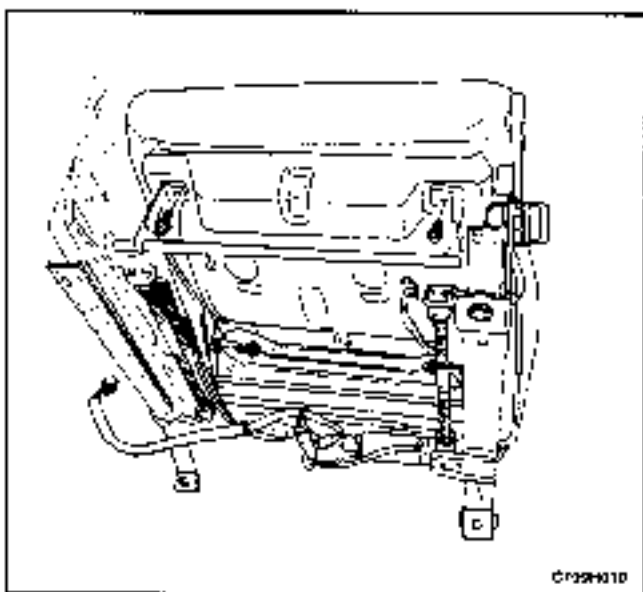
3. Install the seat cover to its original position.

4. Install the back panel onto the seat with the screws.

#### Tighten

Tighten the front seat cover screws to 12 N•m (106 lb-in).

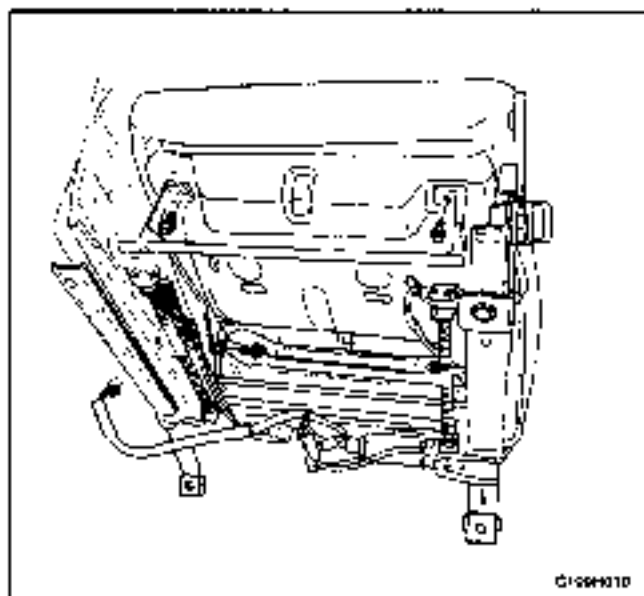
5. Install the front bucket seat in the vehicle. Refer to "Front Bucket Seats" in this section.



## FRONT SEAT CUSHION

### Removal Procedure

1. Remove the front seat from the vehicle. Refer to "Front Bucket Seats" in this section.
2. Remove the seat cushion bolts (power driver seat shown, manual driver seat similar).
3. Remove the cushion from the seat track.



### Installation Procedure

1. Install the cushion onto the seat track.

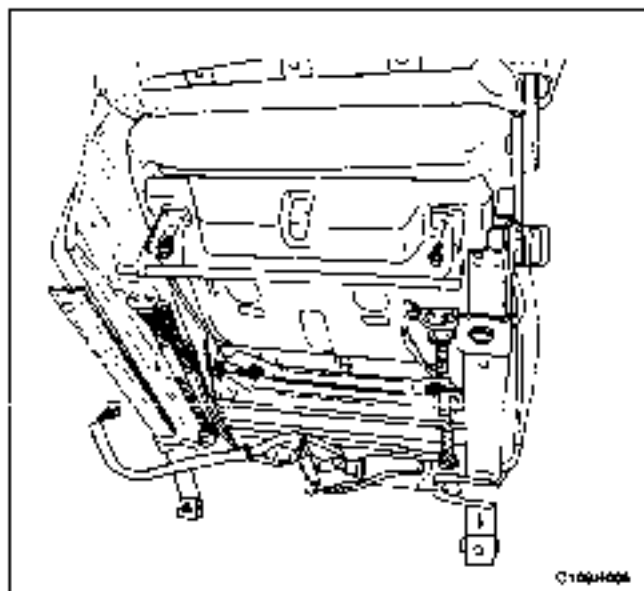
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the seat track to the seat cushion with the bolts (power driver seat shown, manual driver seat similar).

### Tighten

Tighten the front seat cushion bolts to 12 N•m (106 lb-in).

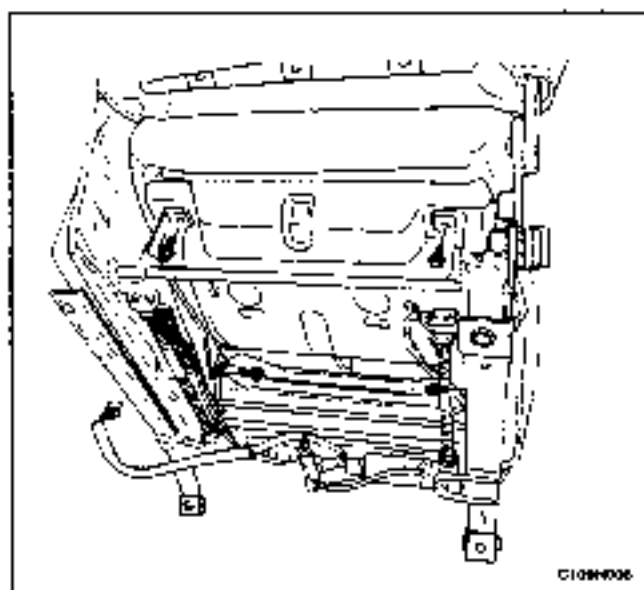
3. Install the front seat in the vehicle. Refer to "Front Bucket Seats" in this section.



## FRONT BUCKET SEAT TRACK

### Removal Procedure

1. Remove the seatback. Refer to "Front Seatback" in this section.
2. Remove the seat trim. Refer to "Front Seat Trim" in this section.
3. Remove the seat cushion bolts (power driver seat shown, manual driver seat similar).
4. Remove the seat track from the seat cushion.



### Installation Procedure

1. Install the cushion onto the seat track.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

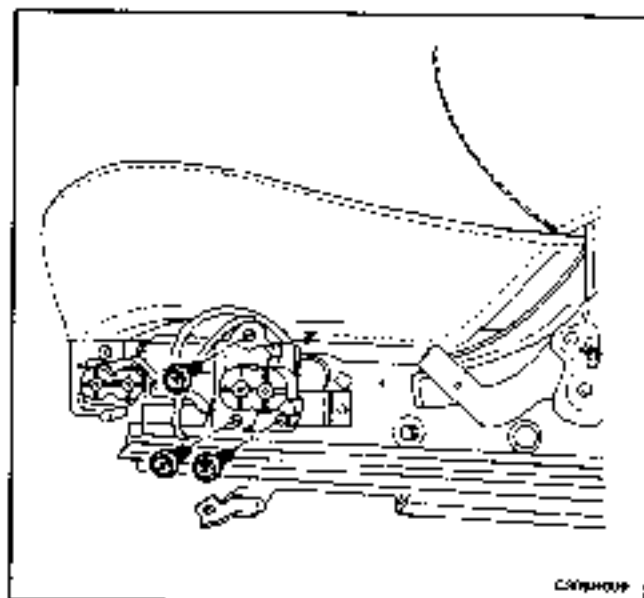
2. Install the seat track to the seat cushion with the seat cushion bolts (power driver seat shown, manual driver seat similar).

### Tighten

Tighten the front seat cushion bolts to 12 N•m (106 lb-in).

3. Install the seat trim. Refer to "Front Seat Trim" in this section.
4. Install the seatback. Refer to "Front Seatback" in this section.

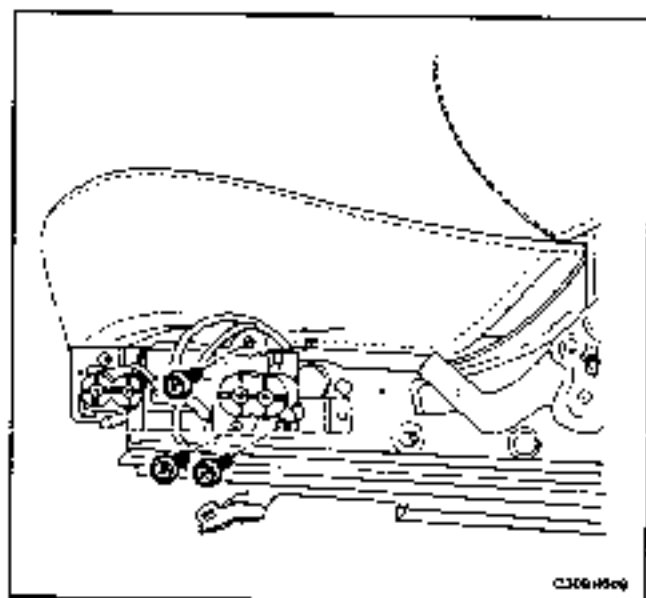




## POWER DRIVER SEAT TILT MOTORS

### Removal Procedure

1. Remove the driver seat. Refer to "Front Bucket Seat" in this section.
2. Remove the front seat trim. Refer to "Front Seat Trim" in this section.
3. Remove the bolts and the motor.



### Installation Procedure

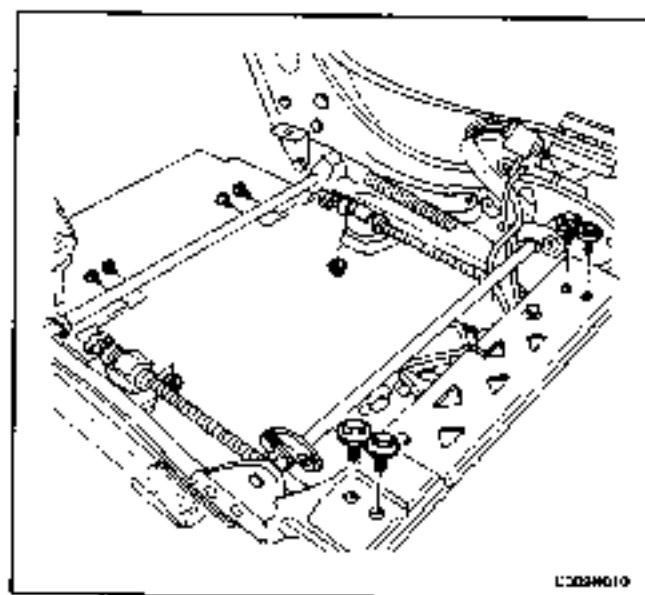
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the motor with the bolts (front motor shown).

#### Tighten

Tighten the tilt motor bolts to 13 N•m (115 lb-in).

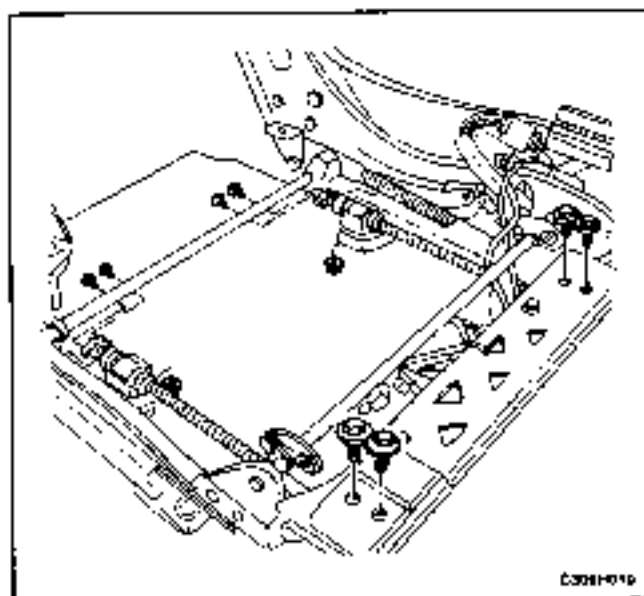
2. Install the front seat trim. Refer to "Front Seat Trim" in this section.
3. Install the driver seat. Refer to "Front Bucket Seat" in this section.



## POWER DRIVER SEAT SLIDE ASSEMBLY

### Removal Procedure

1. Remove the driver seat. Refer to "Front Bucket Seat" in this section.
2. Remove the front seat cushion. Refer to "Front Seat Cushion" in this section.
3. Disconnect the electrical connector.
4. Remove the bolts, the nuts, the screws, and the slide assembly.



### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the slide assembly with the bolts, the nuts, and the screws.

#### Tighten

Tighten the slide assembly bolts to 25 N·m (18 lb-ft).

Tighten the slide assembly nuts to 15 N·m (11 lb-ft).

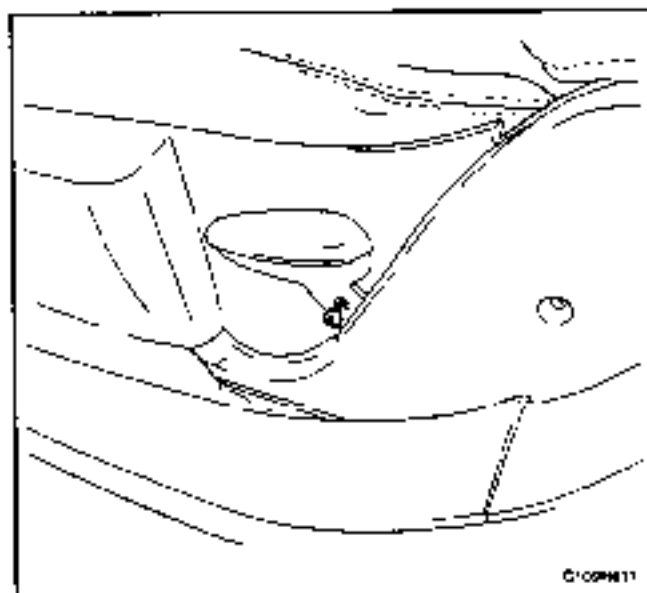
Tighten the slide assembly screws to 10 N·m (89 lb-in).

2. Connect the electrical connector.
3. Install the front seat cushion. Refer to "Front Seat Cushion" in this section.
4. Install the driver seat. Refer to "Front Bucket Seat" in this section.

### SEAT RECLINER LEVER

#### Removal Procedure

1. Remove the screw and the seat recliner lever (power driver seat shown, manual driver seat similar).



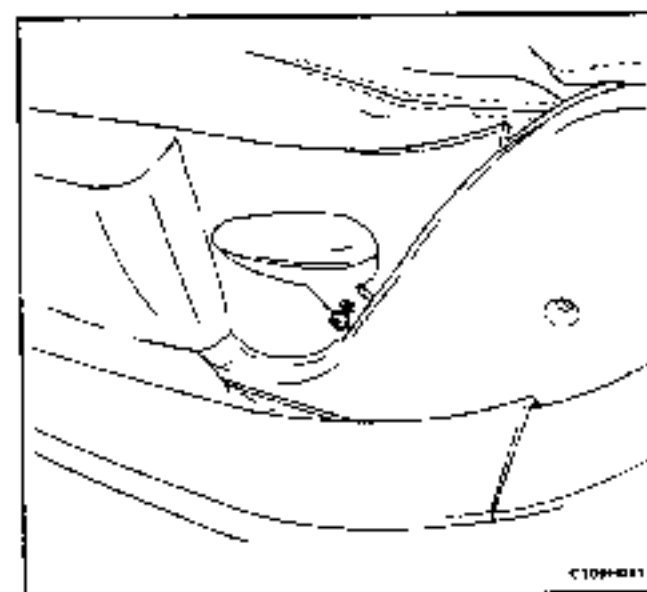
#### Installation Procedure

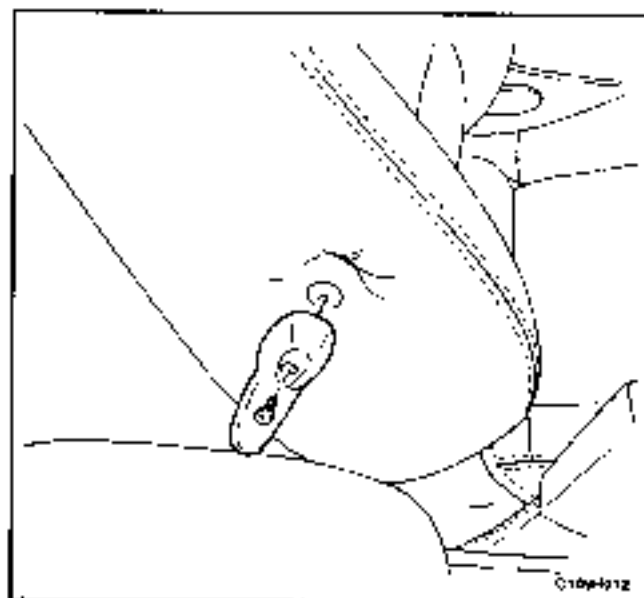
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the seat recliner lever with the screw (power driver seat shown, manual driver seat similar).

#### Tighten

Tighten the seat recliner lever screw to 12 N·m (106 lb-in).

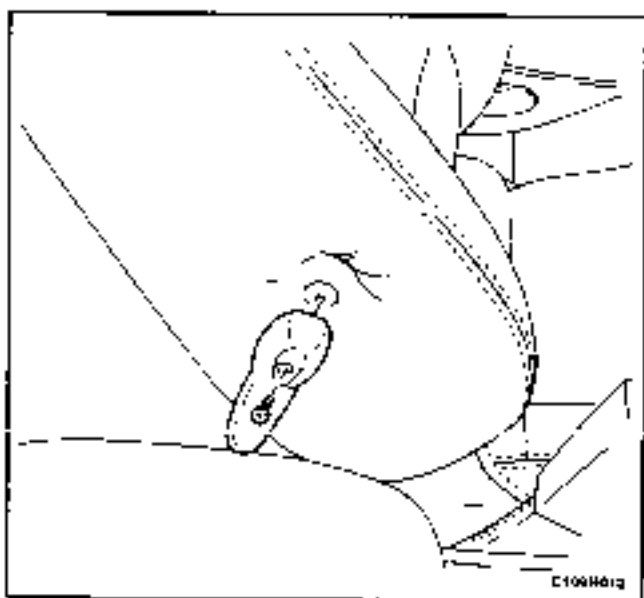




## LUMBAR SUPPORT LEVER

### Removal Procedure

1. Remove the screw and the lumbar support lever.



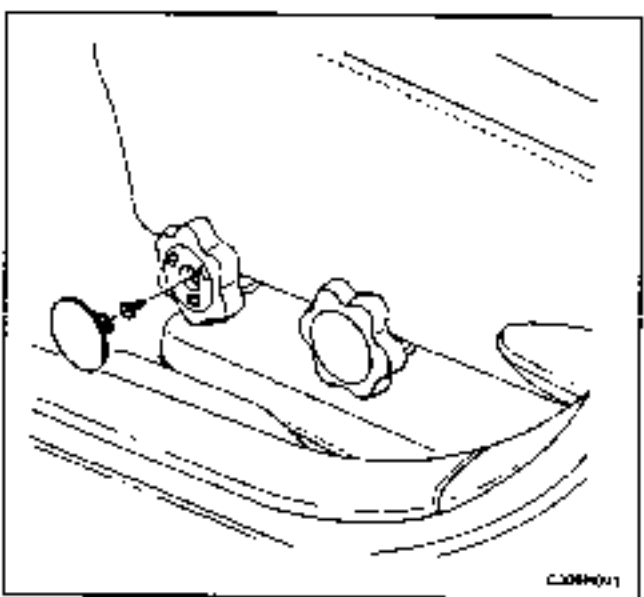
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the lumbar support lever with the screw.

### Tighten

Tighten the lumbar support lever screw to 10 N•m (89 lb-in).

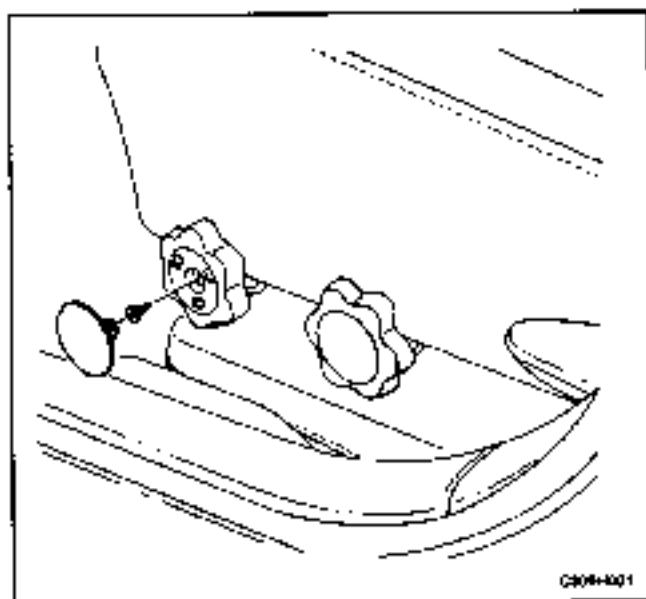


## HEIGHT ADJUSTMENT KNOBS

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Remove the cap to reveal the screw.
2. Remove the screw and the height adjustment knob (front knob shown).



C1064001

### Installation Procedure

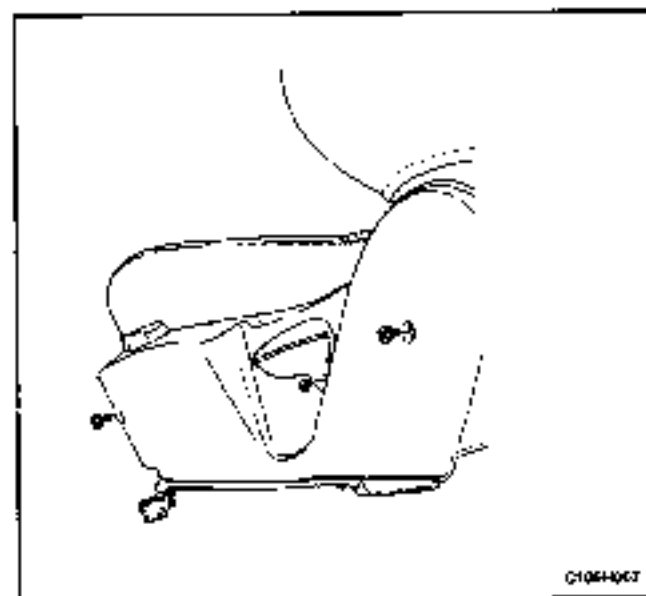
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the height adjustment knob with the screw (front knob shown)

#### Tighten

Tighten the height adjustment knob screw to 2 N•m (18 lb•ft).

2. Install the cap onto the height adjustment knob.

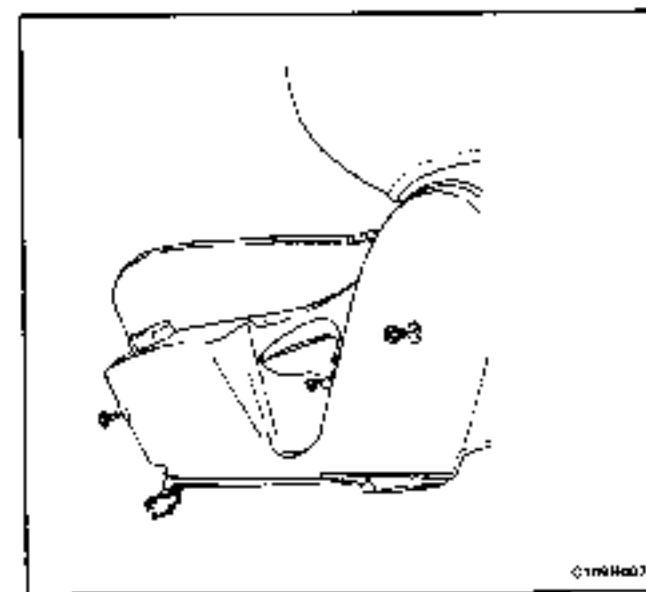


C1064007

### FRONT SEAT TRIM

#### Removal Procedure

1. Remove the front bucket seat from the vehicle. Refer to "Front Bucket Seats" in this section.
2. Remove the screw and the recliner lever (power driver seat shown, manual driver seat similar).
3. Remove the screws and the front seat trim.



C1064007

#### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the front seat trim with the screws

#### Tighten

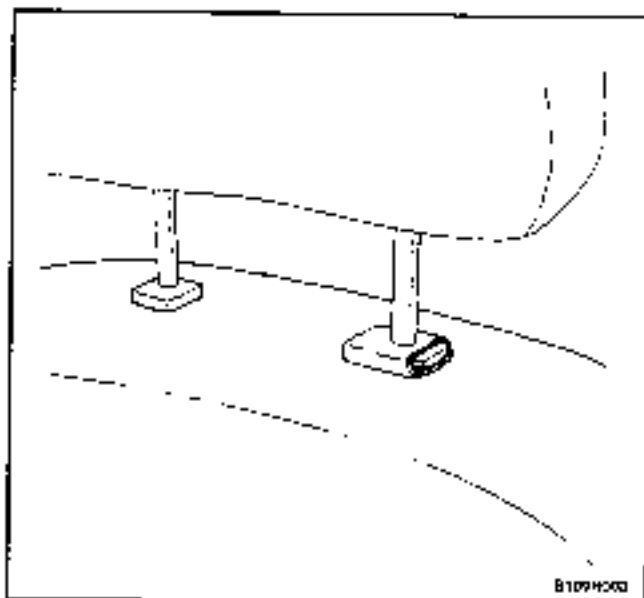
Tighten the front seat trim screws to 12 N•m (106 lb•ft).

2. Install the recliner lever with the screw (power driver seat shown, manual driver seat similar).

#### Tighten

Tighten the seat recliner lever screw to 12 N•m (106 lb•ft).

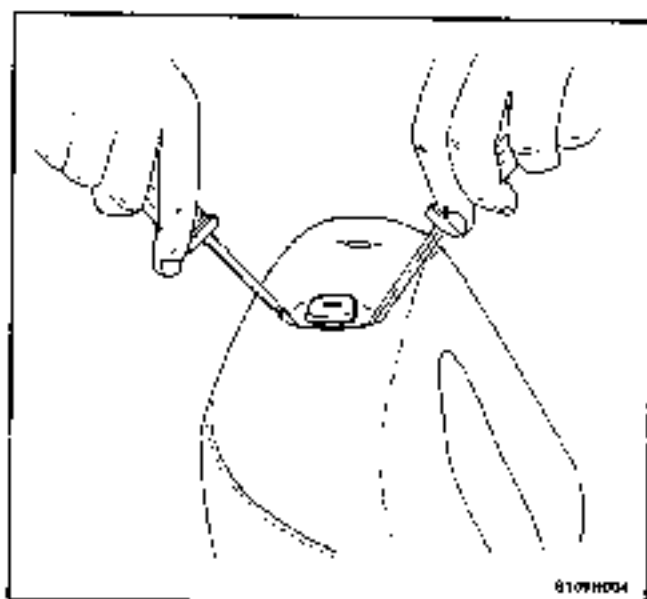
3. Install the front bucket seat in the vehicle. Refer to "Front Bucket Seats" in this section



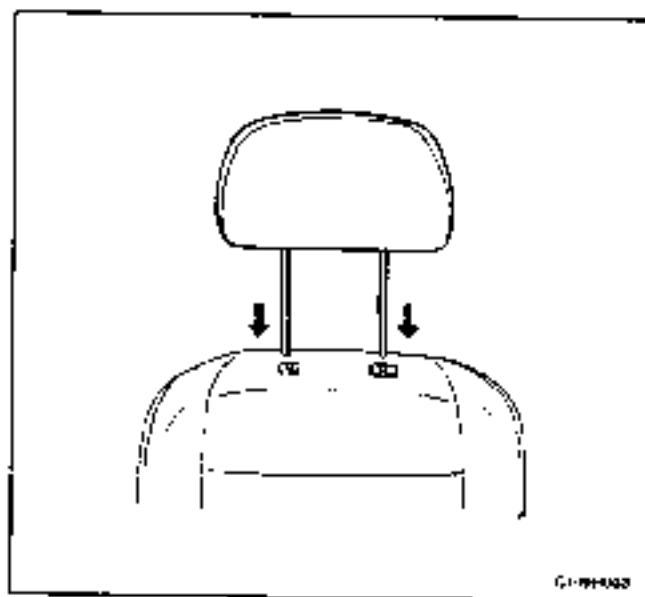
## HEAD RESTRAINT

### Removal Procedure

1. Press in the head restraint adjust button and remove the head restraint from the seatback.

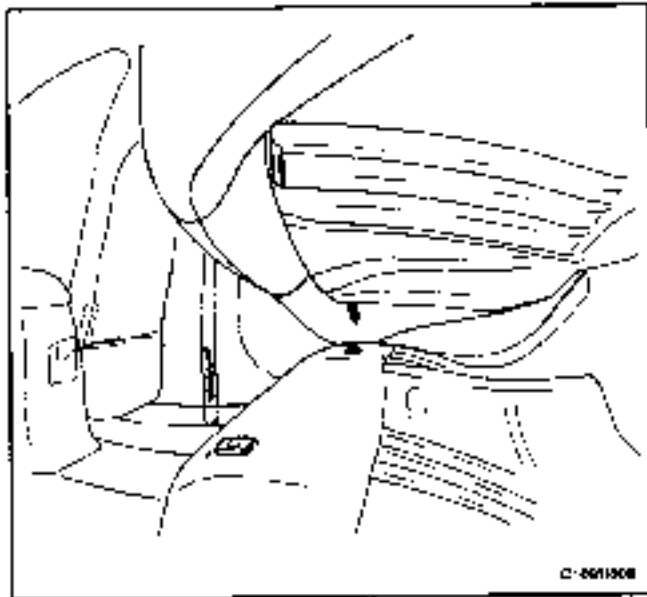


2. Insert two flat head screwdrivers down the front and back side of the guide sleeves.
3. With the screwdrivers, press in the retaining latches and remove the guide sleeves.



### Installation Procedure

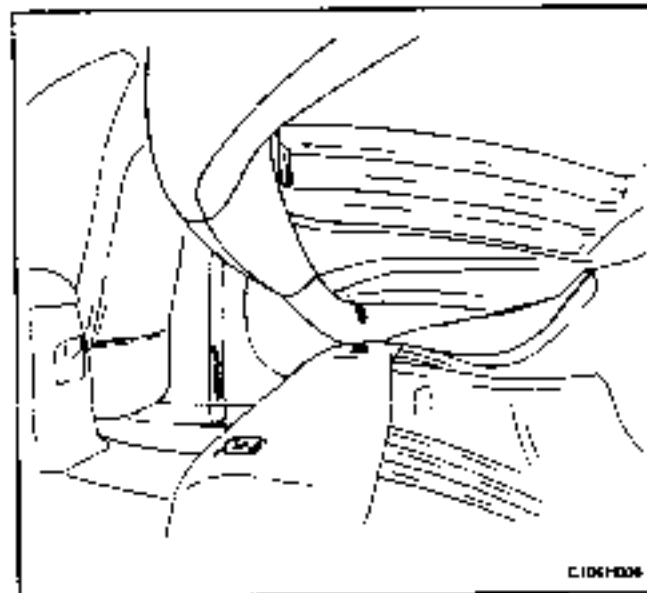
1. Install the guide sleeves into the seatback and press them down in order to engage the guide sleeve retaining latches.
2. Install the head restraint into the guide sleeves.



## REAR SEAT CUSHION

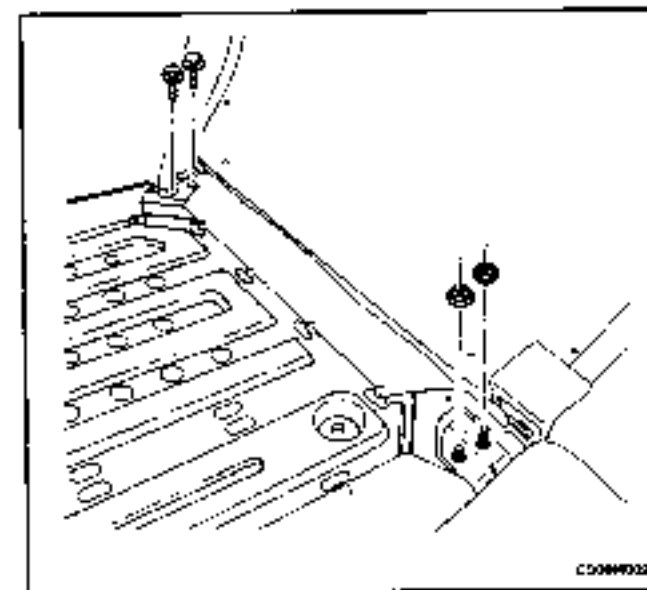
### Removal Procedure

1. Remove the rear seat cushion from the floor by lifting it off the retaining brackets and sliding it forward.



### Installation Procedure

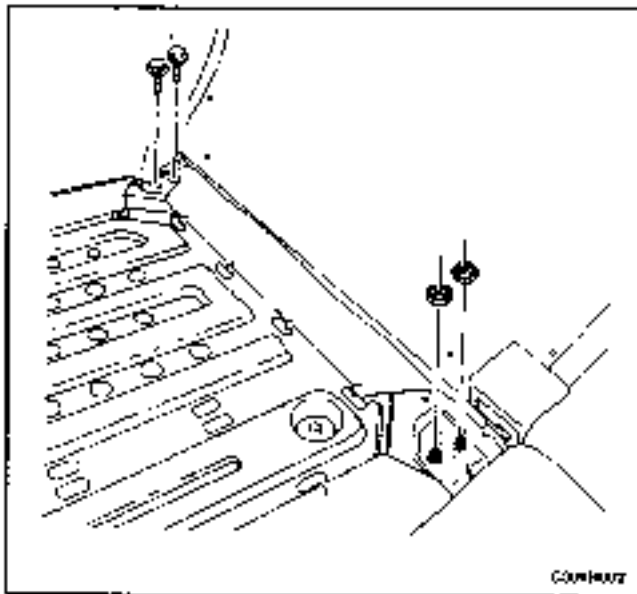
1. Install the rear seat cushion by inserting the metal loops into the rear retaining brackets and pressing the front of the seat cushion down.



## SPLIT REAR SEATBACK

### Removal Procedure

1. Lower the rear seatbacks.
2. Remove the retaining clips and reposition the rear seatback backside cover.
3. Remove the nuts, the bolts, and the seatback from the hinges.



### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

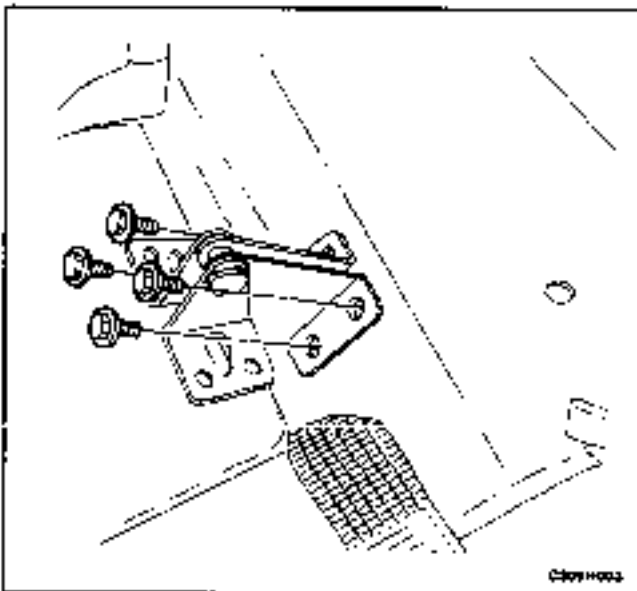
1. Install the seatback to the hinges with the bolts and the nuts.

#### Tighten

Tighten the rear seatback bolts to 25 N·m (18 lb-ft).

Tighten the rear seatback nuts to 25 N·m (18 lb-ft).

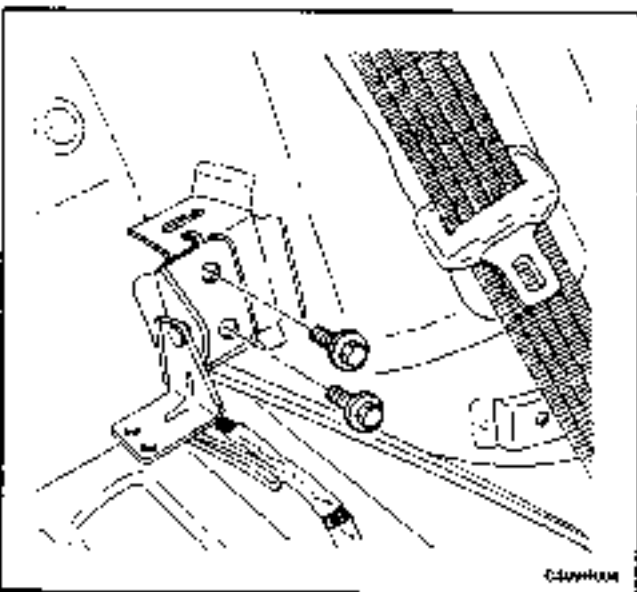
2. Install the rear seatback backside cover with the retaining clips.
3. Raise and secure the rear seatbacks in the upright position.

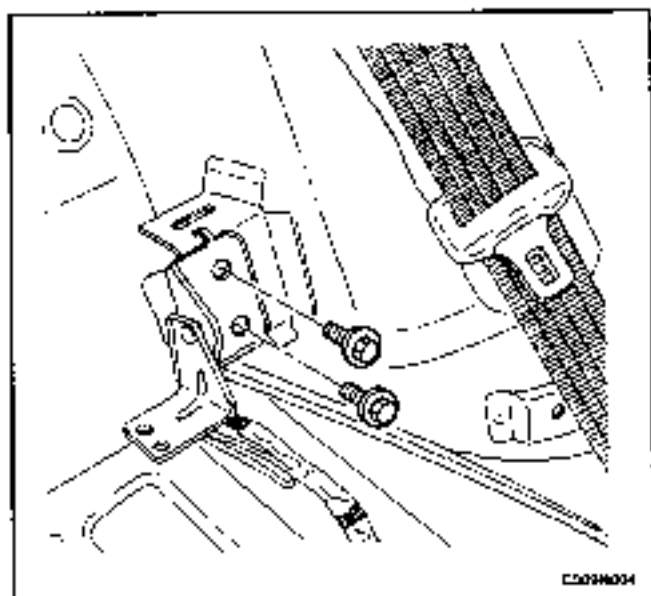


### SPLIT REAR SEATBACK HINGE

#### Removal Procedure

1. Remove the rear seatback and the rear seat cushion. Refer to "Split Rear Seatback" and "Rear Seat Cushion" in this section.
2. Remove the bolts and the seatback center hinge.
3. Remove the bolts and the seatback inner hinge.
4. Remove the rear seat side bolster cushion. Refer to "Rear Seat Side Bolster Cushion" in this section.
5. Remove the bolts and the seatback outer hinge.





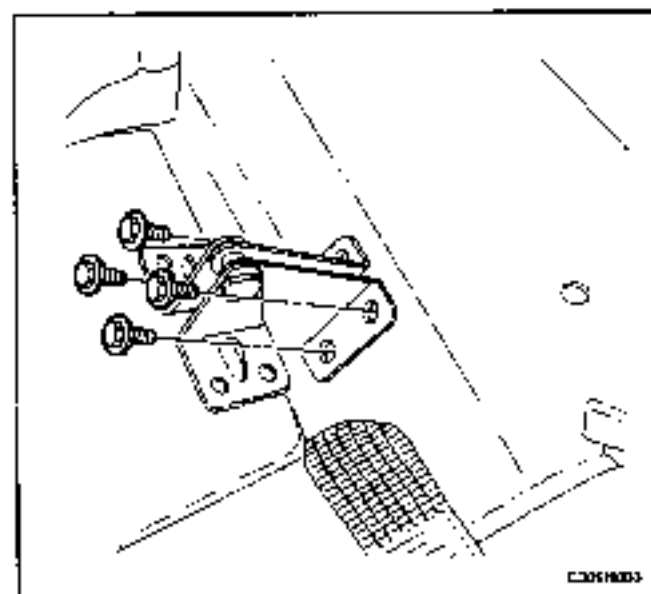
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the seatback outer hinge with the bolts.

#### Tighten

Tighten the rear seat hinge bolts to 12 N·m (106 lb-in).

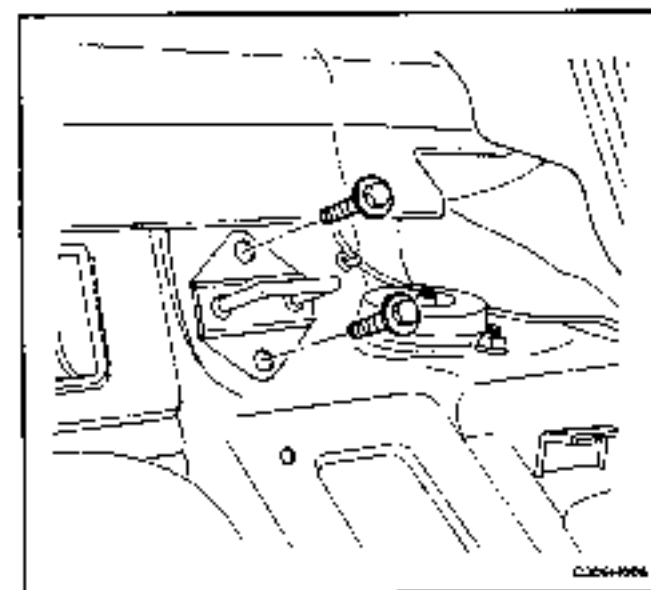


2. Install the rear seat side bolster cushion. Refer to "Rear Seat Side Bolster Cushion" in this section.
3. Install the seatback center hinge with the bolts.

#### Tighten

Tighten the rear seat hinge bolts to 12 N·m (106 lb-in).

4. Install the rear seatback and the rear seat cushion. Refer to "Split Rear Seatback" and "Rear Seat Cushion" in this section.

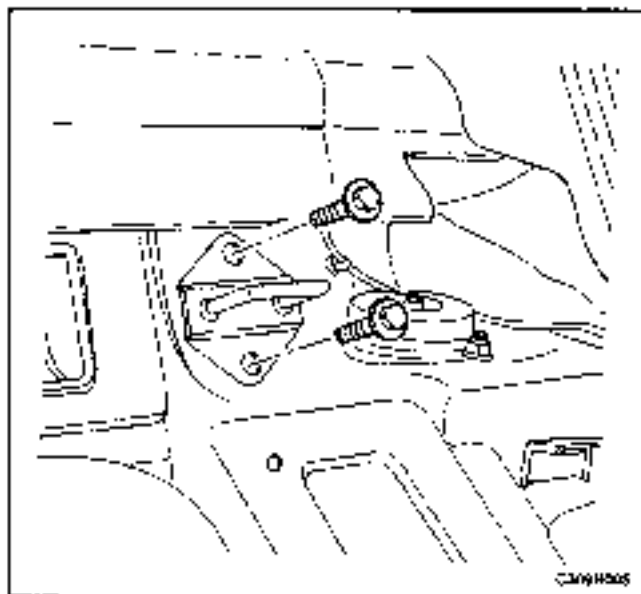


### SPLIT REAR SEATBACK LOCK STRIKER

#### Removal Procedure

1. Lower the rear seatbacks.
2. Remove the rear seat side bolster cushion. Refer to "Rear Seat Side Bolster Cushion" in this section.
3. Remove the retaining clips and the back panel trim cover.
4. Remove the bolts and the seatback lock strikers.





### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the seatback lock strikers with the bolts.

#### Tighten

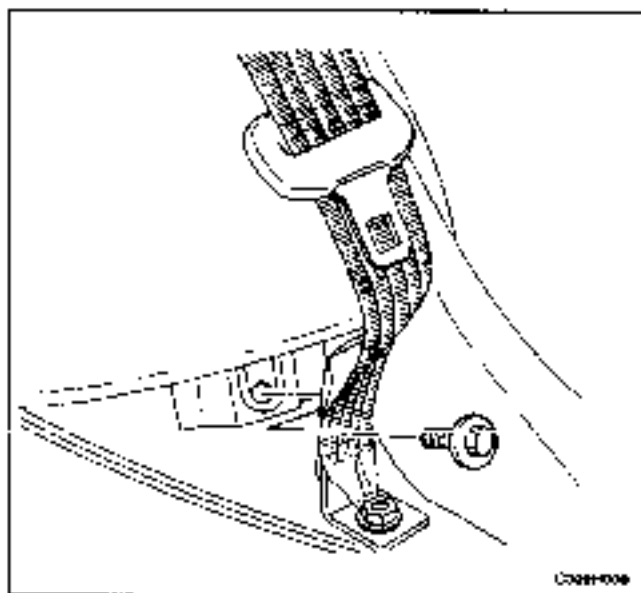
Tighten the rear seatback lock striker bolts to 25 N·m (18 lb-ft).

2. Install the back panel trim cover with the retaining clips.
3. Install the rear seat side bolster cushion. Refer to 'Rear Seat Side Bolster Cushion' in this section.
4. Raise and secure the rear seatbacks in the upright position.

## REAR SEAT SIDE BOLSTER CUSHION

### Removal Procedure

1. Remove the rear seat cushion. Refer to 'Rear Seat Cushion' in this section.
2. Remove the bolt that secures the rear seat side bolster cushion.
3. Lift and remove the rear seat side bolster cushion.



### Installation Procedure

1. Slide the rear seat side bolster cushion into the retaining brackets.

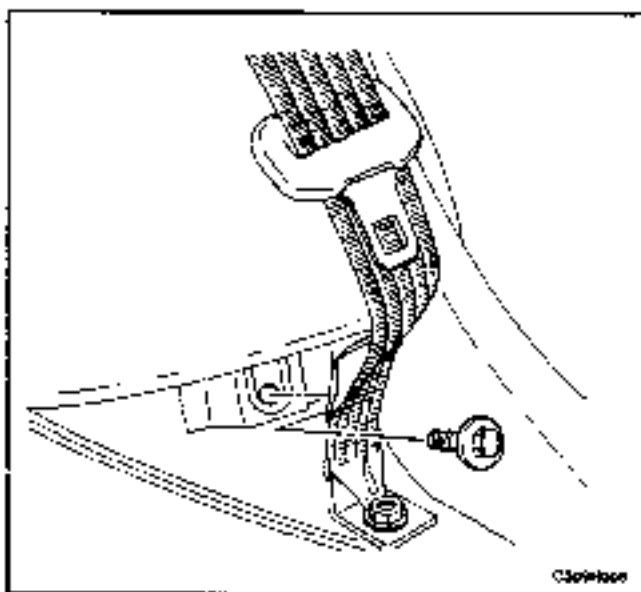
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

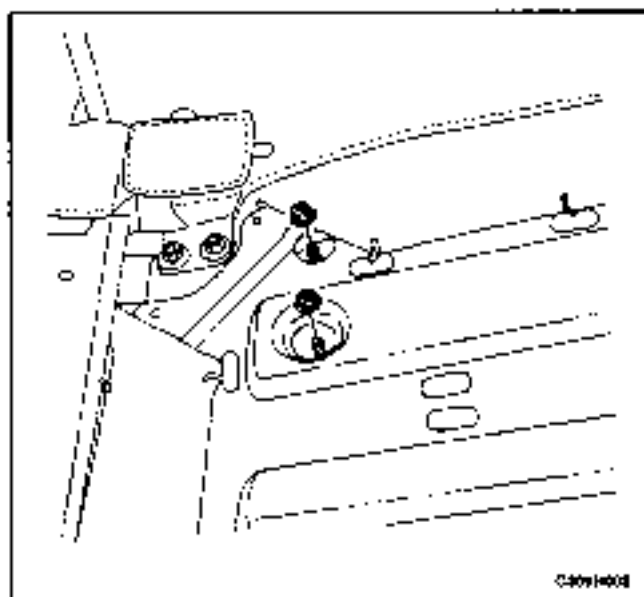
2. Install the rear seat side bolster cushion with the bolt.

#### Tighten

Tighten the rear seat side bolster cushion bolt to 25 N·m (18 lb-ft).

3. Install the rear seat cushion. Refer to 'Rear Seat Cushion' in this section.

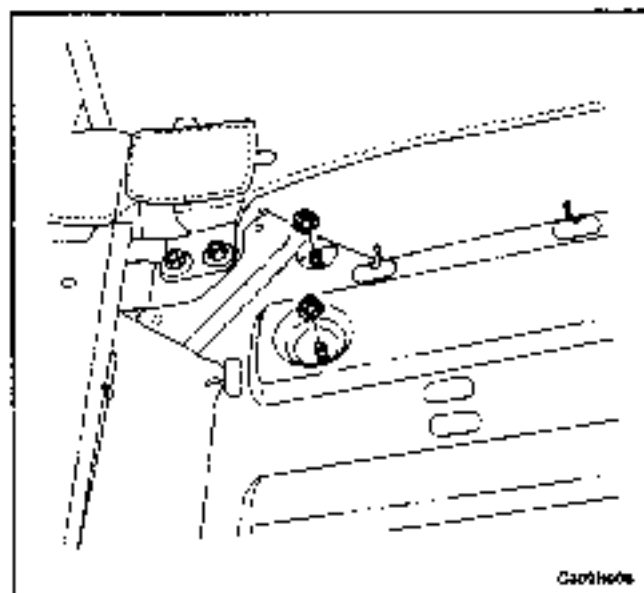




## REAR SEAT CENTER ARMREST

### Removal Procedure

1. Lower the rear seatbacks.
2. Remove the retaining clips and reposition the rear seatback backside cover.
3. Remove the nuts and the armrest.



### Installation Procedure

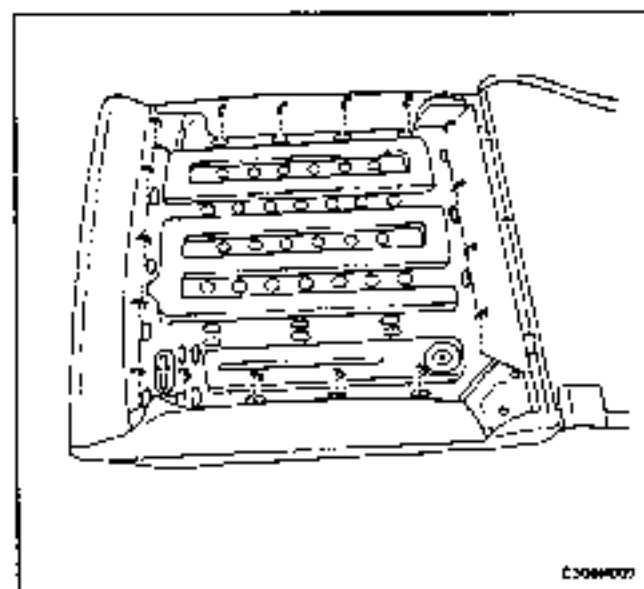
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the armrest with the nuts.

#### Tighten

Tighten the armrest nuts to 12 N•m (108 lb-in).

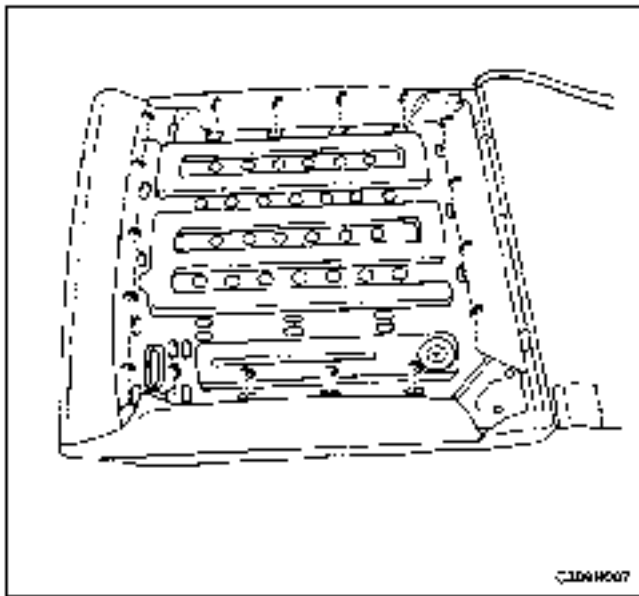
2. Install the rear seatback backside cover with the retaining clips.
3. Raise and secure the rear seatbacks in the upright position.



## SEAT COVERS

### Removal Procedure

1. Remove the seatback and/or cushion. Refer to "Front Seatback," "Front Seat Cushion," "Split Rear Seatback," and/or "Rear Seat Cushion" in this section.
2. Remove the hog rings from the seatback and/or cushion.
3. Remove the seat cover from the seatback and/or cushion.



### Installation Procedure

1. Install the seat cover onto the seatback and/or cushion with new hog rings.
2. Install the seatback and/or seat cushion. Refer to "Front Seatback," "Front Seat Cushion," "Split Rear Seatback," and/or "Rear Seat Cushion" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### SEATS

**Important:** Do not attempt to change the designed seat position by altering the designed seat adjuster-to-floor pan anchor provisions or the seat adjuster-to-seat frame anchor provisions. Changing seat position could affect the performance of the seat system.

This vehicle is equipped with front bucket seats with separate, adjustable head restraints and a three-passenger rear bench seat with an optional split folding rear seat. The front bucket seats also have a recline, a height, and a lumbar adjustment. A power driver seat is optional. Seat cushions and backs have formed foam pads, which fit the contours of the full panel seatback frame assembly and also the designed contour of the seat cushion frame.

## SECTION 9I

# WATERLEAKS

## TABLE OF CONTENTS

<b>Specifications</b> .....	<b>9I-1</b>	<b>Diagnosis</b> .....	<b>9I-2</b>
Recommended Materials for Waterleak Repairs .....	9I-1	Waterleak Diagnosis .....	9I-2
Watertest Stand Specifications .....	9I-1	<b>Maintenance and Repair</b> .....	<b>9I-5</b>
		On-Vehicle Service .....	9I-5
		Waterleak Repair .....	9I-5

## SPECIFICATIONS

### RECOMMENDED MATERIALS FOR WATERLEAK REPAIRS

Leak Areas	Repair Materials
Windshield, back window	Urethane adhesive, caulking kit or the equivalent
Metal joints	Brushable seam sealer which can be painted
Ventilation ducts	3M™ Auto Bedding and Glazing Compound or the equivalent
Small cracks and pin holes	3M™ Drip-Check Sealer or the equivalent
Large holes	3M™ Automotive Joint and Seam Sealer
Weatherstrips	3M™ 08011 Weatherstrip Adhesive or the equivalent
Bolts, studs, and screws	Strip caulk

### WATERTEST STAND SPECIFICATIONS

Application	Description
Nozzle Type	Full jet spray nozzle #1/2 GG-25 or equivalent with a 50° included angle
Nozzle Height	Approximately 1 600 mm (63.0 in.) from the floor
Volume of Flow	14L (3.7 gal) per minute
Pressure	155 kPa (22.5 psi) measured at the nozzle
Windshield and A-Pillar Test Stand Position	Approximately 30° down, 45° toward the rear, and aimed at the corner of the windshield
B-Pillar Test Stand Position	Approximately 30° down, 45° toward the rear, and aimed at the center of the rear door
Back Window and Rear Deck Lid Test Stand Position	Approximately 30° down, 30° toward the front and aimed approximately 610 mm (24.0 in.) from the corner of the back window

## DIAGNOSIS

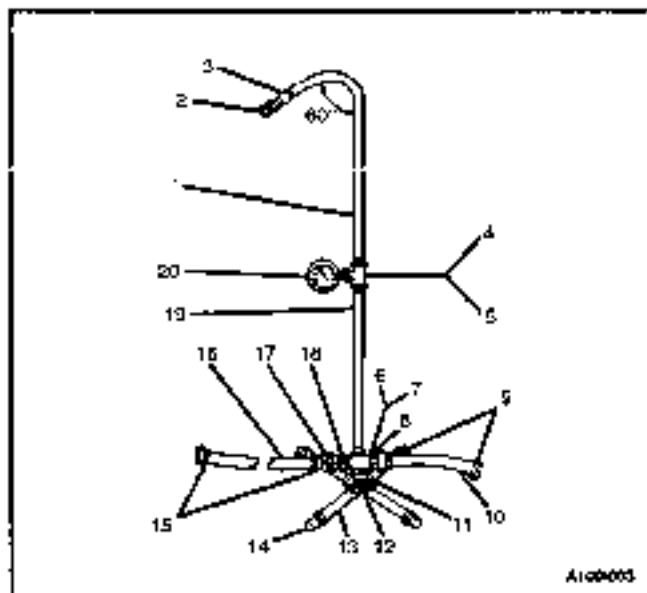
### WATERLEAK DIAGNOSIS

The repair of waterleaks in the body requires proper testing and diagnosis. Repair waterleaks by adjusting the misaligned parts and using the proper repair materials. First, determine what conditions cause the leak. For example, the leak may occur only when the vehicle is parked on an incline, or water may appear only in the spare tire compartment. Second, test the area for the source of the leak using the following testing methods. If the general leak area is found, determine the exact entry point of the leak by using a water hose or an air hose. If the general leak area is not obvious, use the watertest stands to determine the area of the leak. It may be necessary to remove some interior trim panels or some parts in order to locate the leaks.

**Important:** It is necessary to find the origin of all the leaks before making any repairs. Random repairs may stop the leak only temporarily and may make future repairs more difficult. Continue localized testing in the general area in order to ensure that all leaks are found.

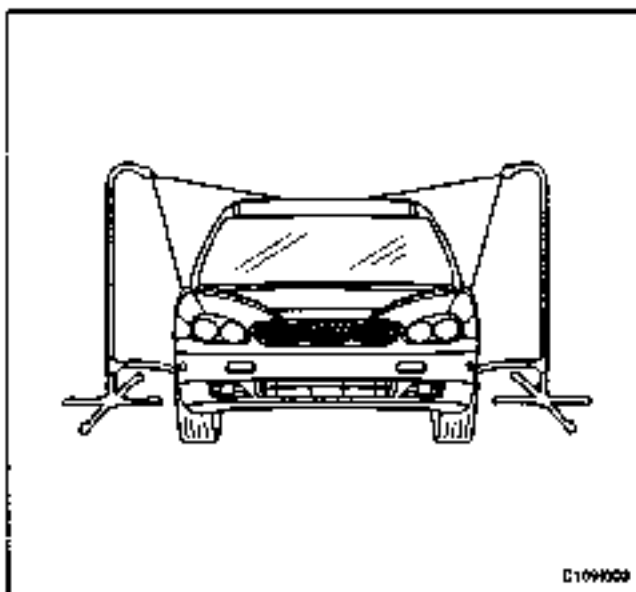
### Generalized Testing

1. Set up the watertest stands

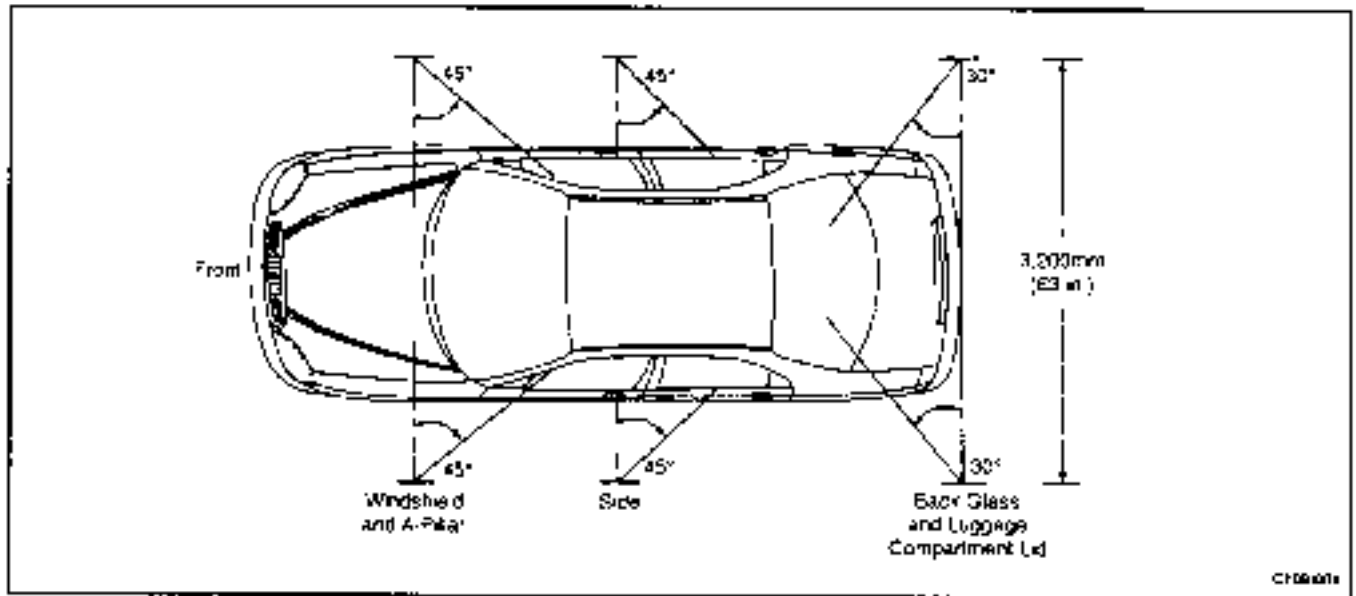


- 1 1/2-inch by 36-inch Pipe
- 2 Full-jet Spray Nozzle #1/2 GG-25 or Equivalent  
Nozzle Height at 1,600 mm to the Floor
- 3 1/2-inch Coupling
- 4 1/2-inch by 1/2-inch by 1/4-inch Reducing T  
(Right Only)
- 5 1/2-inch Coupling (Left Only)
- 6 1/2-inch Cross (Right Only)
- 7 1/2-inch Tee (Left Only)
- E 1/2-inch Pipe-to-Hose Nipple (Right Only)
- G 5/8-inch Female Hose Coupling
- 10 5/8-inch Input Hose (2 Feet Long, Right Only)
- 11 1/2-inch Close Nipple
- 12 1/2-inch Cross with Weld-on 1/2-inch Cap
- 13 1/2-inch by 1/2-inch Nipple
- 14 1/2-inch Cap
- 15 5/8-inch Female Hose Coupling
- 16 5/8-inch Cross Hose (12 Feet Long)
- 17 5/8-inch Hose Quick Connect
- 18 1/2-inch Pipe-to-Hose Nipple
- 19 1/2-inch by 30-inch Pipe (Straight)
- 20 1/4-inch Water Pressure Gauge (Right Only)

2. Set up the watertest stand - leak test.



3. Perform the water test: stand leak test. Refer to 'Water Test Stand Specifications' in this section.
4. If the local water pressure does not allow the required water pressure of 155 kPa (22.5 psi), move both stands closer to the vehicle so that the water spray overlaps.

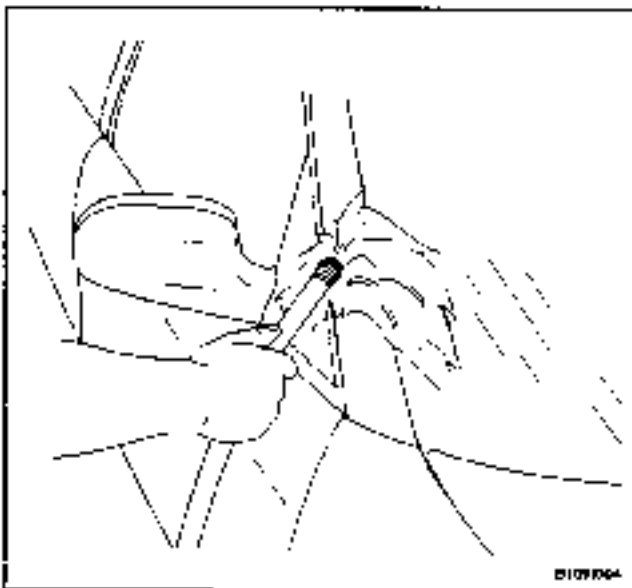


### Localized Testing (Spot Test)

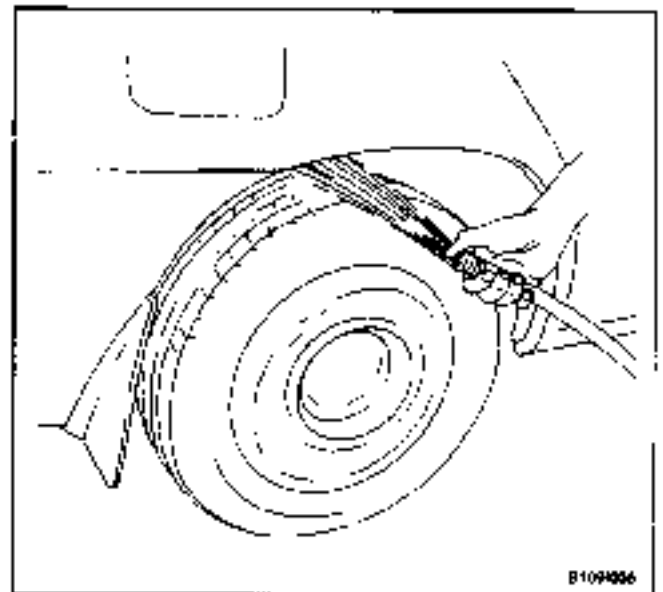
1. Do localized testing with a water hose or an air hose.
2. Begin testing by spraying the air or the water at the base of the suspected leak area. Continue spraying the air or the water upward until the leak is found.

### Water Hose Test

1. Place another person inside the vehicle in order to detect the location of the leak.
2. Use a water hose without a nozzle.

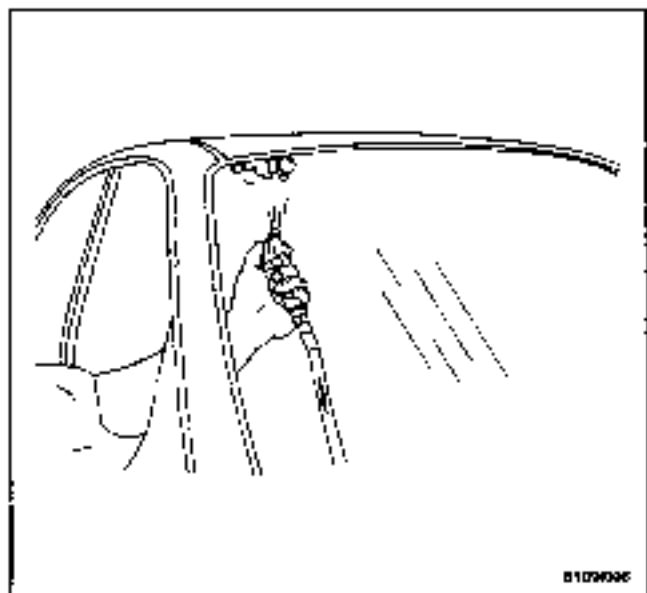


3. Begin spraying the water at the base of the suspected leak area. Continue spraying the water upward until the leak is found.



### Air Hose Test

1. Apply soapy water to the outside of the vehicle in the suspected leak area.
2. Blow air from inside the vehicle. The air pressure should not exceed 205 kPa (29.7 psi).
3. Determine the location of the leaks from the bubbles formed in the soapy water.



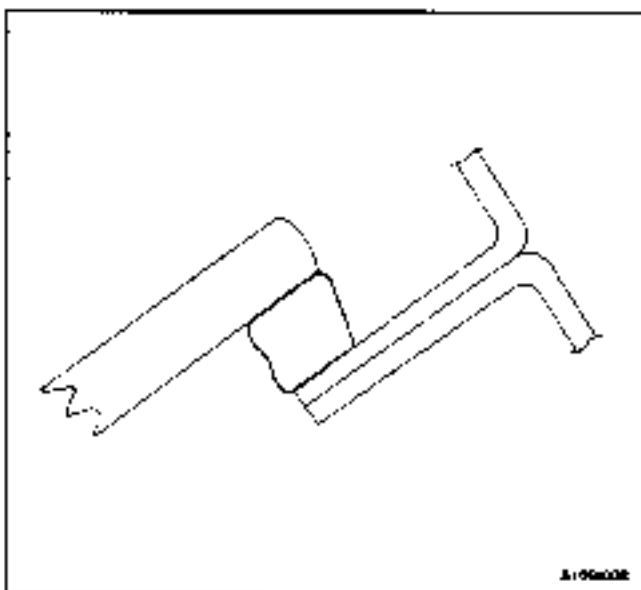
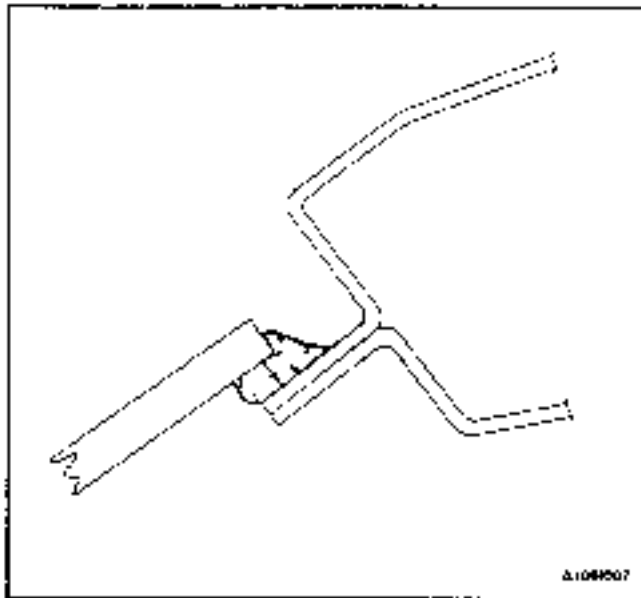


**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****WATERLEAK REPAIR**

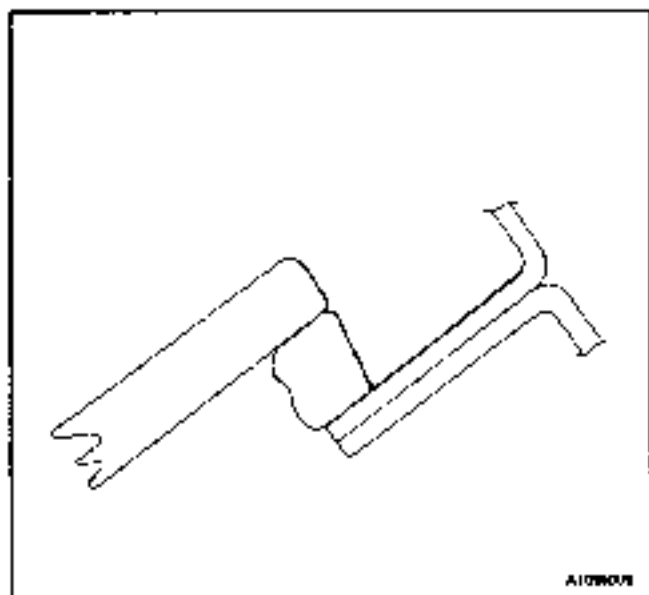
Some water leaks around the glass can be repaired without removing the glass.

**Important:** This type of repair may be used only for urethane-installed glass.

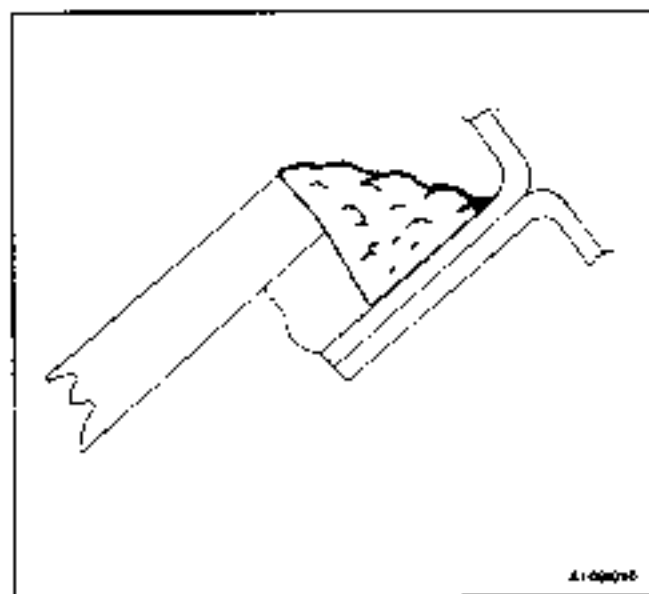
1. Remove the reveal molding in the area of the leak. It may be necessary to remove the garnish molding or the trim strip face in order to locate the leak.
2. While spraying water over the leak area, carefully push the glass outward in order to determine the size of the leak.
3. Mark the location of the leak.
4. Use water to clean any dirt from the area. Dry the area with an air hose.
5. Using a sharp knife, trim off the uneven edges of the adhesive caulking material around the leak for a distance of 75 to 100 mm (3 to 4 inches) on both sides of the leak.



6. Using a sharp knife, trim off the uneven edges of the adhesive material around the leak 75 to 100 mm (3 to 4 inches) on both sides of the leak.

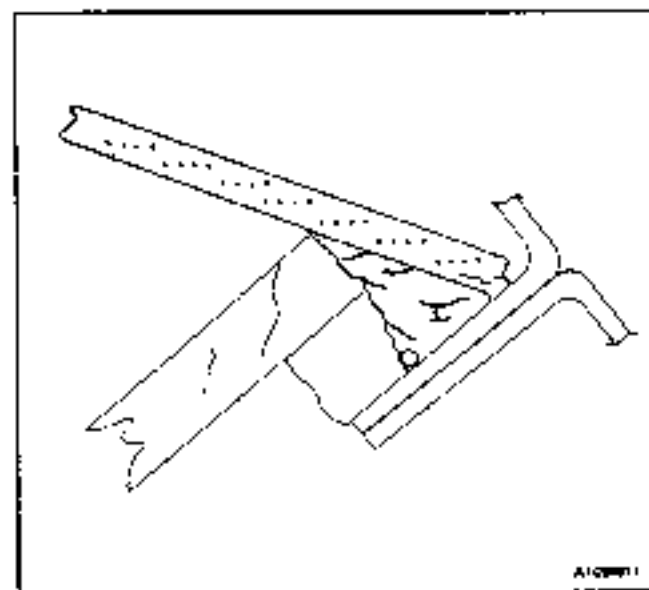


7. Prime the trimmed area with the primer.



8. Allow the primer to dry for 5 minutes.

9. Apply the adhesive over the leak and for a distance of 75 to 100 mm (3 to 4 inches) on both sides of the leak.



10. Immediately after applying the adhesive, use a flat stick or a similar tool to work the adhesive into the leak area and into the joint between the original material and the vehicle body in order to ensure a watertight seal.

11. Spray warm or hot water over the repaired area in order to determine if the leak was repaired. Do not run a heavy stream of water directly on the freshly-applied adhesive.

12. Install the trim strip face if it was removed.

13. Install the garnish molding if it was removed.

14. Install the reveal molding.

**Important:** After the completion of any waterleak repair, re-test the area using the watertest stands. Do not use localized testing procedures on the newly-repaired areas, as the repair material may dislodge under abnormal pressure.

## SECTION 9J

# WINDNOISE

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Windnoise Diagnosis .....	9J-1	On-Vehicle Service .....	9J-2
		Windnoise Repair .....	9J-2

## DIAGNOSIS

### WINDNOISE DIAGNOSIS

**Caution:** An assistant should drive the vehicle while the technician checks for the location of the windnoise, in order to prevent personal injury or vehicle damage.

A test drive in the vehicle is necessary to accurately determine the location of the windnoise. Often there is a primary leak and secondary leaks. Failure to repair all leaks will only reduce the windnoise, not eliminate it.

During the test drive the technician should bring the following items to aid in determining the location of the windnoise.

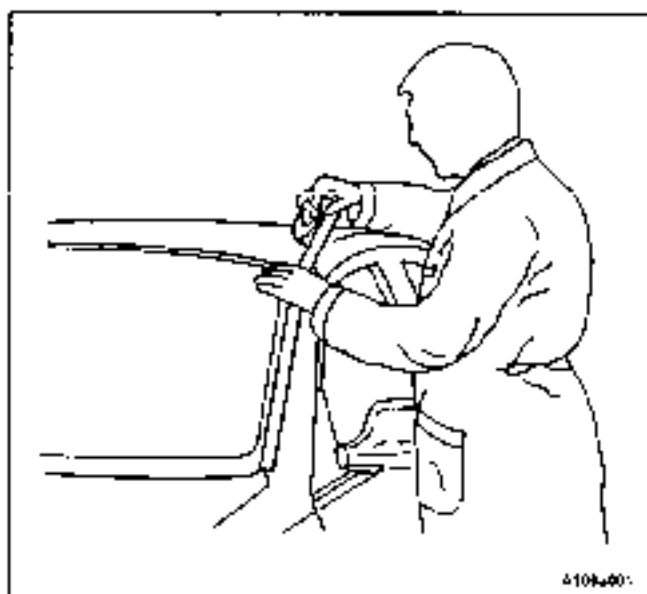
- A mechanics stethoscope or vacuum hose
- Masking tape
- Strip caulk
- A china marking pencil
- A screwdriver

Perform the following steps in order to conduct the road test:

1. Choose a route that includes smooth straight streets that run in all four directions (north, south, east, and west).
2. Choose streets with little traffic or noise that would interfere with the test.
3. Drive the vehicle at the speeds at which the noise was noticed by the customer or until the noise is produced. Do not exceed legal speed limits.
4. The windnoise is external if any of the following conditions occur:
  - The windnoise is caused by the wind.
  - The windnoise can be heard with the door glass lowered and while the vehicle is being driven.
  - The windnoise is eliminated when tape is placed over various moldings and gaps.

5. Internal windnoise is air leaving the vehicle and should be repaired in the following manner:

- In order to locate the leak, taps off the body lock pillar pressure relief valves. This will cause air pressure to build up inside the vehicle and enhance the windnoise.
- Use a stethoscope or a vacuum hose to locate the leak.
- Temporarily repair the leak with masking tape.



- Continue testing in order to determine if the noise has been eliminated or if other leaks exist.
- When all leaks have been found, return to the shop and make permanent repairs with the proper alignment techniques and sealing materials.

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### WINDNOISE REPAIR

Windnoise leak repairs are very similar to waterleak repairs. Refer to *Section 9I, Waterleaks*. The actual procedure depends on the type of seal being repaired.

Leaks around the door opening weatherstrips do not always indicate a faulty weatherstrip. A door or window adjustment may resolve the condition. Refer to *Section 9F, Doors* or *Section 9I, Glass and Mirrors*.

## SECTION 9K

# SQUEAKS AND RATTLES

## TABLE OF CONTENTS

Diagnosis .....	9K-1	Maintenance and Repair .....	9K-3
Squeak and Rattle Diagnosis ..	9K-1	On-Vehicle Service .....	9K-3
		Squeak and Rattle Repair .....	9K-3

## DIAGNOSIS

### SQUEAK AND RATTLE DIAGNOSIS

#### Rattle Coming From the Side Rail

Checks	Action
Check the brake lines.	<ul style="list-style-type: none"><li>• Tap lightly on the brake lines and listen for a rattle.</li><li>• Install plastic tie straps to secure the brake lines tightly together.</li></ul>

#### Rattle Under Vehicle at Higher RPM

Checks	Action
Check for heat shield contact with the underbody.	<ul style="list-style-type: none"><li>• Raise the vehicle and perform a visual inspection.</li><li>• Bend the heat shield slightly to gain clearance from the underbody.</li></ul>

#### Squeak From the Front of the Vehicle in Cold Weather

Checks	Action
Check the front stabilizer shaft insulators.	<ul style="list-style-type: none"><li>• While the vehicle is cold, perform a test drive and achieve full front suspension travel by driving through a dip in the road.</li><li>• Remove the insulators and wrap teflon tape around the stabilizer shaft. Reinstall the insulators over the tape.</li></ul>

#### Thump From Rear of Vehicle on Bumps

Checks	Action
Check for a properly secured spare tire in the rear compartment.	<ul style="list-style-type: none"><li>• Open the rear compartment and perform a visual inspection of the spare tire and the tools.</li><li>• Tightly secure the spare tire and all tools.</li><li>• Perform a road test to verify that the noise is eliminated.</li></ul>

**Glass Knock Coming From the Rear of the Vehicle When Driving Over Bumps**

Checks	Action
Check for an out-of-adjustment hatchback latch.	<ul style="list-style-type: none"> <li>• Test drive the vehicle in order to verify this condition.</li> <li>• Loosen the latch nuts and adjust the latch downward.</li> </ul>

**Rattle Coming From Door**

Checks	Action
Check the door lock solenoid.	<ul style="list-style-type: none"> <li>• Remove the door trim panel and check if the solenoid is loose.</li> <li>• Tighten the solenoid bolts.</li> </ul>
Check for rattling electrical connectors inside the door trim panel.	<ul style="list-style-type: none"> <li>• Tap on the trim panel and listen for a rattle.</li> <li>• Remove the trim panel and wrap foam padding around the connectors as required.</li> </ul>

**Squeak When Operating Doors**

Checks	Action
Check for a lack of lubrication of the door hinge pins.	<ul style="list-style-type: none"> <li>• Operate the doors and listen for squeaks.</li> <li>• Lubricate the door hinge pins with light oil and coat with lithium grease.</li> </ul>

**Squeak Coming From Console When Shifting Manual Transaxle  
(Condition Occurs In Cold Weather with a Cold Engine)**

Checks	Action
Check the manual transaxle control lever lower boot.	<ul style="list-style-type: none"> <li>• Move the control lever between gears and listen for squeaks.</li> <li>• Remove the floor console and replace the lower shift boot or apply talcum powder to the lower shift boot.</li> </ul>

**Buzz From the Left Side of Instrument Panel**

Checks	Action
Check for vibration of the fuse box cover against the instrument panel side trim.	<ul style="list-style-type: none"> <li>• Tap on the cover with a finger and listen for a buzz.</li> <li>• Apply 6.35 mm (0.250 inch) by 25.4 mm (1.00 inch) felt pads to the side trim where the cover makes contact.</li> </ul>

**Squeak Coming From Instrument Cluster Trim Plate**

Checks	Action
Check for rubbing of the cluster trim plate on the instrument panel.	<ul style="list-style-type: none"> <li>• Test drive the vehicle in order to verify this condition.</li> <li>• Remove the instrument cluster trim plate and install felt tape to the edges.</li> </ul>

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### SQUEAK AND RATTLE REPAIR

Squeaks and rattles are caused by the unwanted movement between parts of a vehicle. There are three means to prevent squeaks or rattles.

- Attach the parts securely so that there is no relative motion during the operation of the vehicle.
- Separate the parts so that there is no contact during operation.
- Insulate the parts so that no squeaks or rattles occur with the movement of the parts. Low uniform friction surfaces can be used to eliminate "stick-slip" motion.





## SECTION 9L

# GLASS AND MIRRORS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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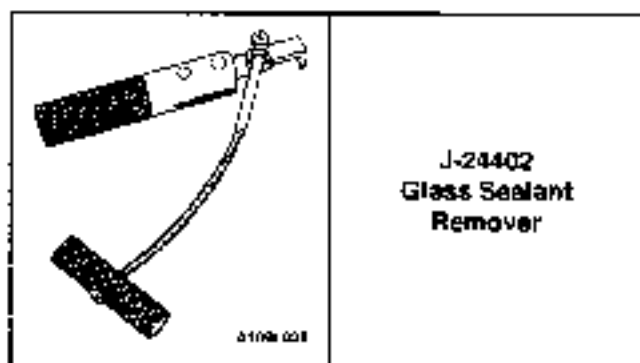
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Glass Screws	7	-	62
Guide Rail Bolts	7	-	62
Guide Rail Screw	4	-	35
Outside Rearview Mirror Assembly Bolts	6	-	53
Rearview Mirror Mounting Bolt	12	-	11

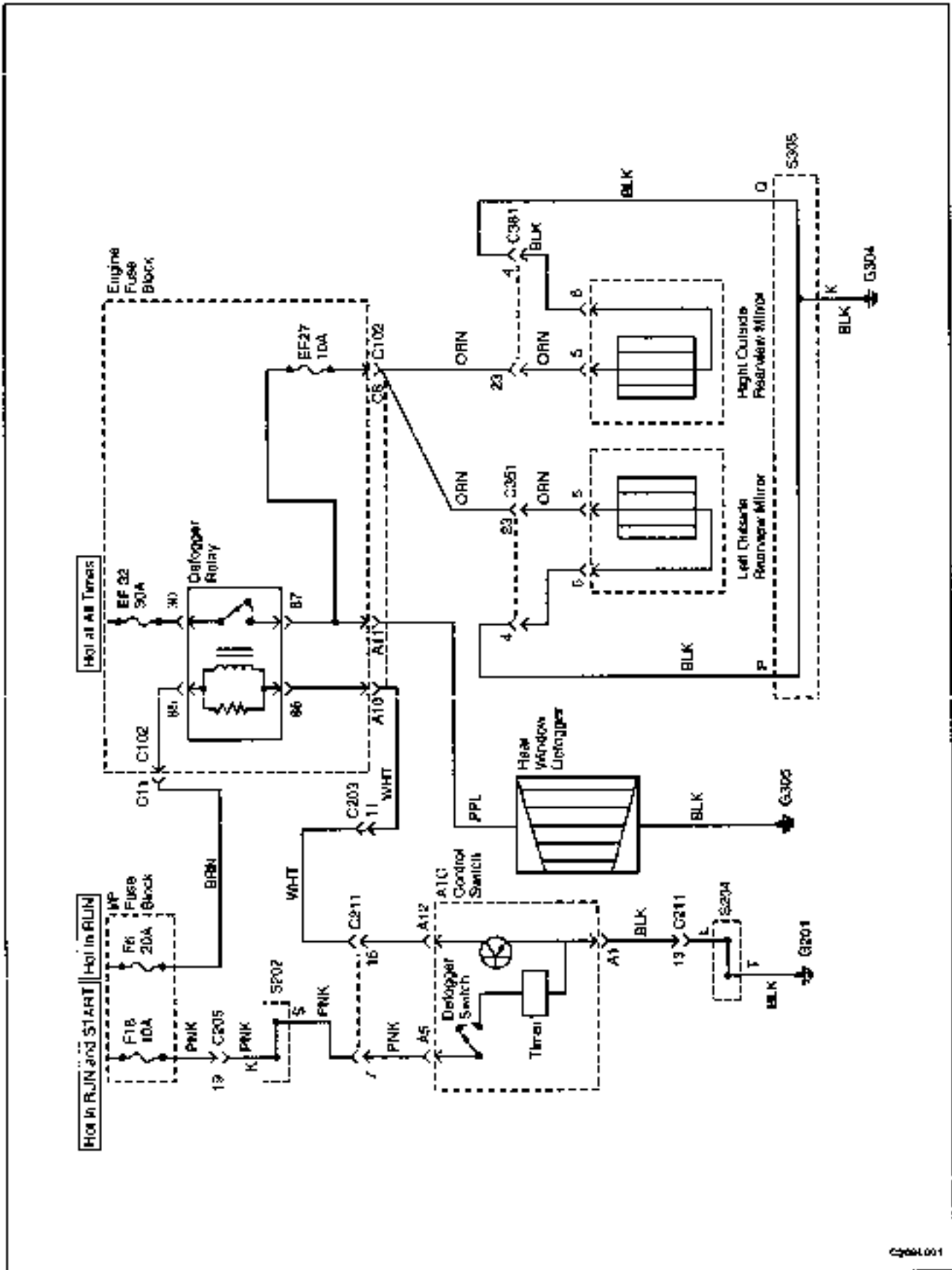
## SPECIAL TOOLS

### SPECIAL TOOLS TABLE



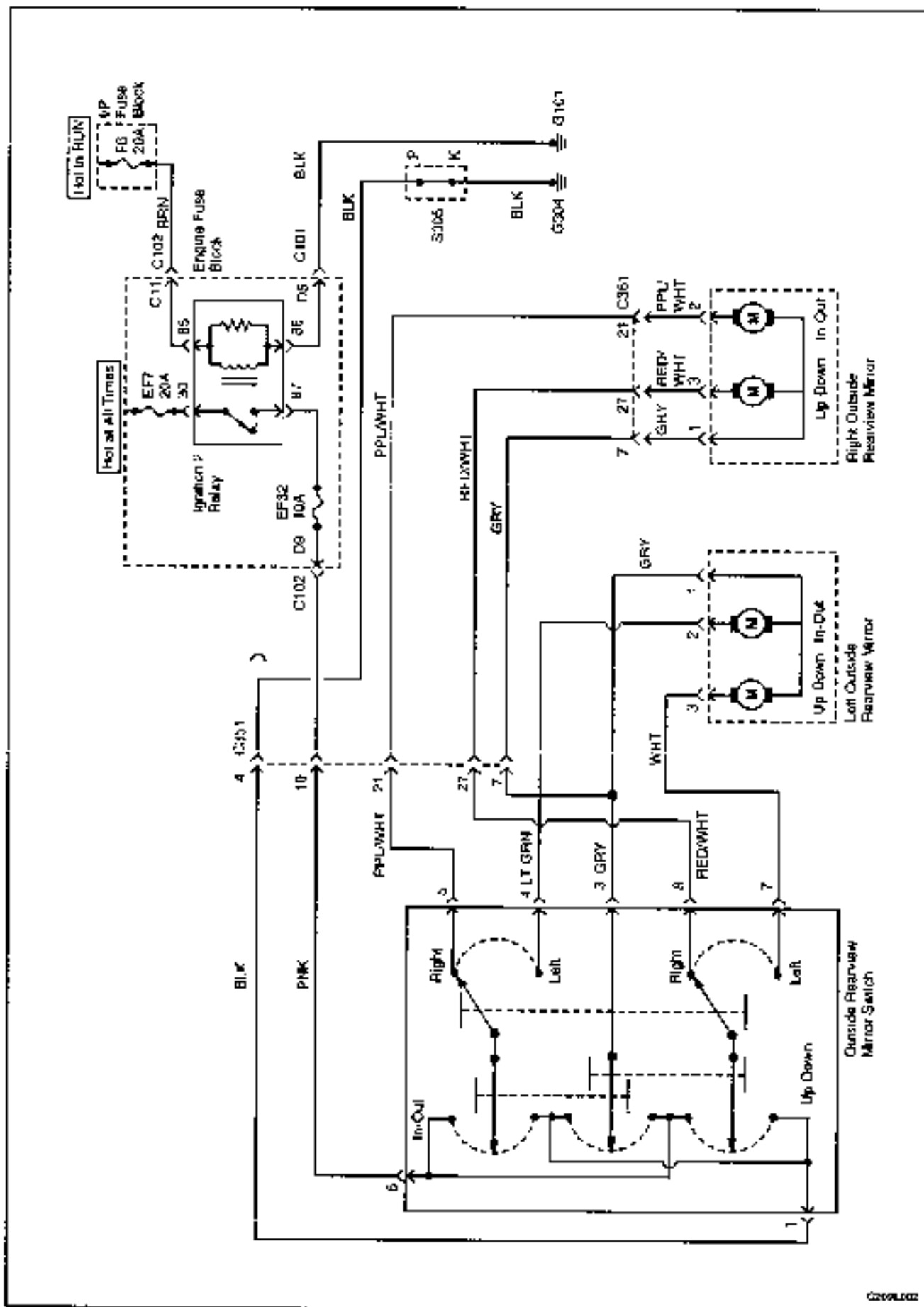
# SCHEMATIC AND ROUTING DIAGRAMS

## REAR WINDOW AND OUTSIDE REARVIEW MIRROR DEFOGGER



C204L001

## ELECTRIC CONTROL OUTSIDE REARVIEW MIRRORS



G206L002

## DIAGNOSIS

### TESTING REAR WINDOW DEFOGGER GRID LINE

If it has been observed during use that a grid line is inoperative, the following procedure can be used to find the break. If none of the grid lines is operating, a full system diagnosis should be completed before attempting to repair the grid lines.

1. Turn the ignition ON.
2. Turn the rear window defogger ON.
3. From the inside of the vehicle, connect a voltmeter to each end of a grid line. The voltmeter will indicate battery voltage if the grid line is open.

**Important:** Use care when touching the voltmeter terminals to a grid line. If the terminals are roughly applied, the grid line may be scratched, resulting in an open circuit.

4. If a grid line is found to be open, move a voltmeter terminal from one side of the grid line and re-test at a point nearer to the other side of the window. Continue to re-test, each time bringing one of the voltmeter terminals closer to the opposite side of the window from where it was originally connected. The break in the grid line is at the point where the voltmeter begins reading 0 volts instead of battery voltage.
5. Use a marking crayon to lightly mark the break point on the rear window. Mark the glass instead of marking directly on the grid line, and make the mark far enough from the grid line so that it can easily be removed without disturbing the repair.
6. Use a grid line repair kit to fix the break in the grid line. Refer to "Rear Window Defogger Grid Line Repair" in this section.

### OUTSIDE MIRROR DEFOGGER

Step	Action	Value(s)	Yes	No
1	Check the rear window defogger. Does the rear window defogger work?	-	Go to Step 4	Go to Step 2
2	Repair the rear window defogger before proceeding with the outside mirror diagnosis. Is the repair complete?	-	Go to Step 3	-
3	Test the outside mirror defoggers. Does the repair of the rear window defogger system also fix the problem with the outside mirror defoggers?	-	System OK	Go to Step 4
4	Check fuse EF27. Is fuse EF27 blown?	-	Go to Step 5	Go to Step 6
5	1. Check for a short circuit and repair it if necessary. 2. Replace the fuse. Is the repair complete?	-	System OK	-
6	1. On the side of the vehicle which has the malfunctioning mirror defogger, remove the black plastic escutcheon from the trim panel side of the door. 2. Disconnect the outside mirror electrical connector. 3. Turn the ignition ON. 4. Turn on the defogger. 5. Use a voltmeter to backprobe terminal 5 (ORN) at the mirror electrical connector. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 8	Go to Step 7
7	Repair the open circuit between fuse EF27 and the mirror connector. Is the repair complete?	-	System OK	-

### Outside Mirror Defoggers (Cont'd)

Step	Action	Value(s)	Yes	No
8	1. Turn the ignition OFF. 2. Disconnect the outside mirror electrical connector. 3. Use an ohmmeter to measure the resistance between terminal 6 (BLK) of the mirror connector and ground. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 10	Go to Step 9
9	Repair the open ground circuit for the outside rearview mirror. Is the repair complete?	-	System OK	-
10	Replace the defective outside rearview mirror. Is the repair complete?	-	System OK	-

## ELECTRIC CONTROL OUTSIDE REARVIEW MIRRORS

### Outside Rearview Mirrors Do Not Adjust

Step	Action	Value(s)	Yes	No
1	Check fuse EF32. Is fuse EF32 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair it if necessary. 2. Replace fuse EF32. Is the repair complete?	-	System OK	-
3	Turn the ignition ON. Check the voltage at fuse EF32. Is the voltage at EF32 equal to the specified value?	11-14 V	Go to Step 5	Go to Step 4
4	Repair the open power supply circuit for fuse EF32. Is the repair complete?	-	System OK	-
5	Check the power mirrors. Are both power mirrors inoperative?	-	Go to Step 6	Go to Step 13
6	1. Remove the retaining screw for the power door mirror and power window switch assembly. 2. Lift the switch assembly so that the connectors on the underside are visible. Is the connector secured to the power mirror switch?	-	Go to Step 8	Go to Step 7
7	Connect the connector to the power mirror switch. Is the repair complete?	-	System OK	-
8	Use an ohmmeter to check the continuity between terminal 4 (BLK) of the mirror switch connector and ground. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 10	Go to Step 9
9	Repair the open ground circuit for the mirror switch. Is the repair complete?	-	System OK	-
10	1. Turn the ignition ON. 2. Check the voltage at terminal 6 (PWR) of the mirror switch connector. Is the voltage equal to the specified value?	11-14 V	Go to Step 12	Go to Step 11
11	Repair the open power supply circuit for the mirror switch. Is the repair complete?	-	System OK	-

## Outside Rearview Mirrors Do Not Adjust (Cont'd)

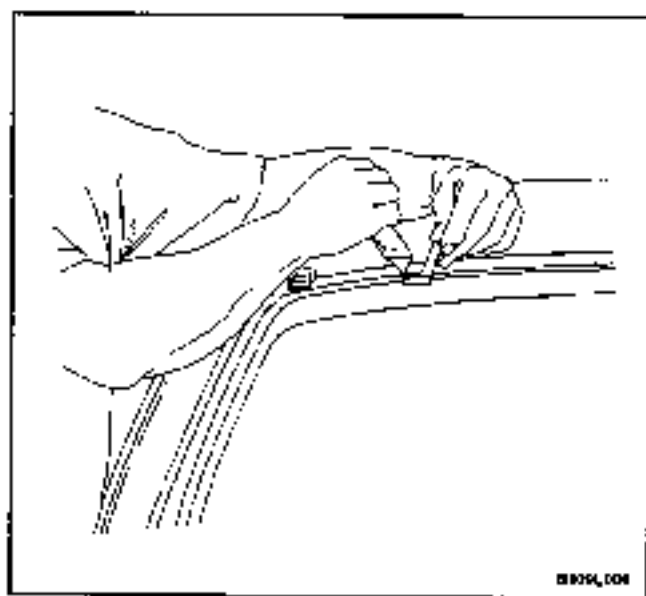
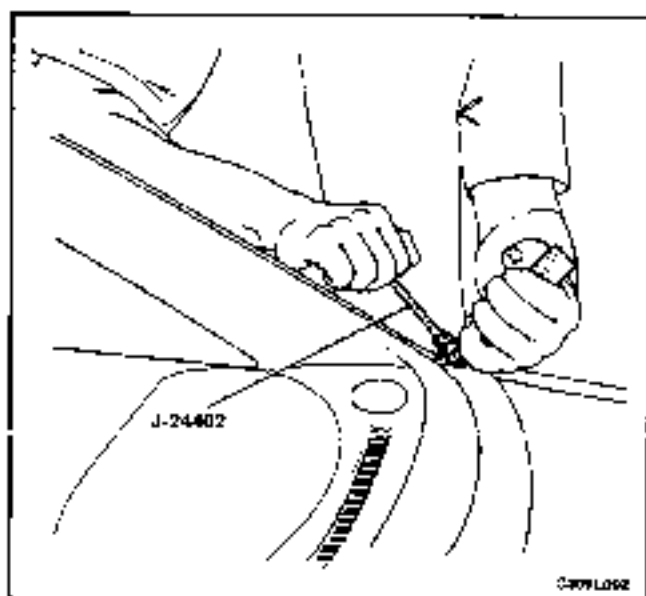
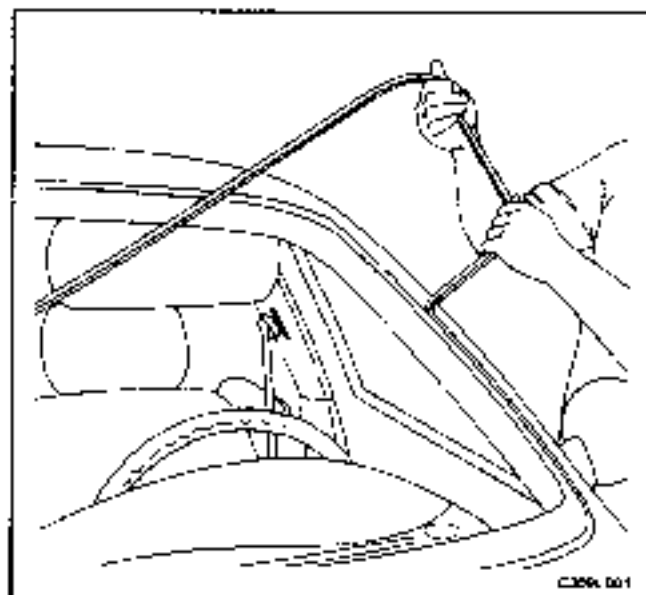
Step	Action	Value(s)	Yes	No
12	Replace the outside rearview mirror switch. Is the repair complete?	-	System OK	-
13	<ol style="list-style-type: none"> <li>On the side which has the inoperative mirror, remove the black plastic escutcheon from the trim panel side of the door.</li> <li>Disconnect the outside mirror electrical connector.</li> <li>Turn the ignition ON.</li> <li>At the outside mirror connector, connect a voltmeter between terminal 1 (GRY) and terminal 2 (LT GRN if testing the driver side or PPL/WHT if testing the passenger side).</li> <li>Operate the In/Out adjustment on the switch, and record the voltage indicated in each switch position.</li> <li>Connect a voltmeter between terminal 1 (GRY) and terminal 3 (WHT if testing the left side or RED/WHT if testing the right side).</li> <li>Operate the Up/Down adjustment on the switch, and record the voltage indicated in each switch position.</li> </ol> <p>Does the voltmeter indicate the specified voltage for each test, with the polarity reversing when the switch was changed from In to Out or Up to Down?</p>	11-14 v	Go to Step 14	Go to Step 15
14	Replace the outside rearview mirror. Is the repair complete?	-	System OK	-
15	<ol style="list-style-type: none"> <li>Remove the retaining screw for the power door mirror and power window switch assembly.</li> <li>Lift the switch assembly so that the connectors on the underside are visible.</li> <li>Leave the outside mirror disconnected, but do not disconnect the mirror switch connector.</li> <li>Turn the ignition ON.</li> <li>At the mirror switch connector, backprobe to measure the voltage between terminal 1 (GRY) and terminal 2 (LT GRN if testing the left side or PPL/WHT if testing the right side).</li> <li>Operate the In/Out adjustment on the switch, and record the voltage indicated in each switch position.</li> <li>Connect a voltmeter between terminal 1 (GRY) and terminal 3 (WHT if testing the left side or RED/WHT if testing the right side).</li> <li>Operate the Up/Down adjustment on the switch, and record the voltage indicated in each switch position.</li> </ol> <p>Does the voltmeter indicate the specified voltage for each test, with the polarity reversing when the switch was changed from In to Out or Up to Down?</p>	11-14 v	Go to Step 16	Go to Step 12
16	Repair the open circuit between the mirror switch and the outside rearview mirror connector. Is the repair complete?	-	System OK	-

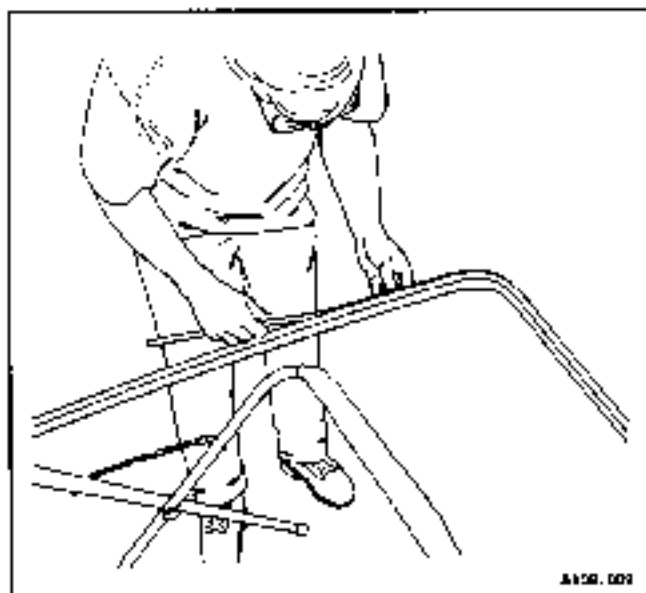
**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****WINDSHIELD****Tools Required**

J-24402 Glass Sealant Remover

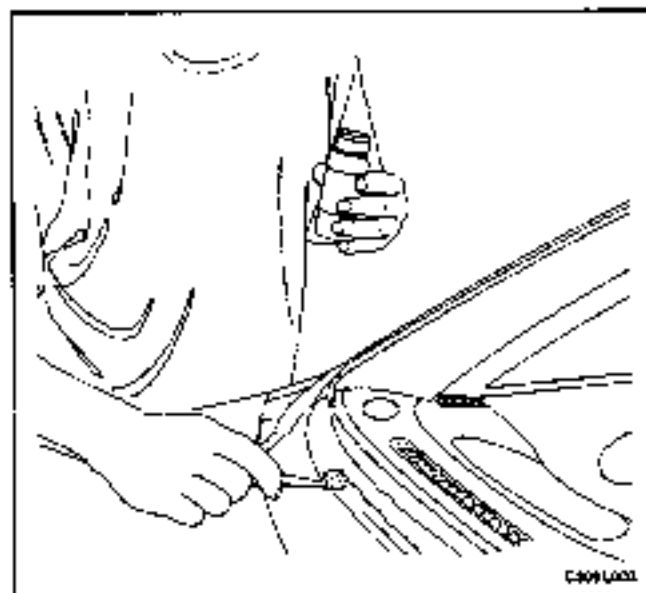
**Removal Procedure**

1. Remove the cowl vent grille. Refer to Section 9R, *Body Front End*.
2. Remove the inside rearview mirror. Refer to "Rearview Mirror" in this section.
3. Remove the weatherstrip around the windshield.
4. Using the glass sealant remover J-24402, cut the adhesive around the windshield.
5. Remove the windshield from the vehicle.
6. Using a knife, remove the adhesive from the windshield.
7. Using a knife, remove the adhesive from the windshield frame.





A128.003



C309.002

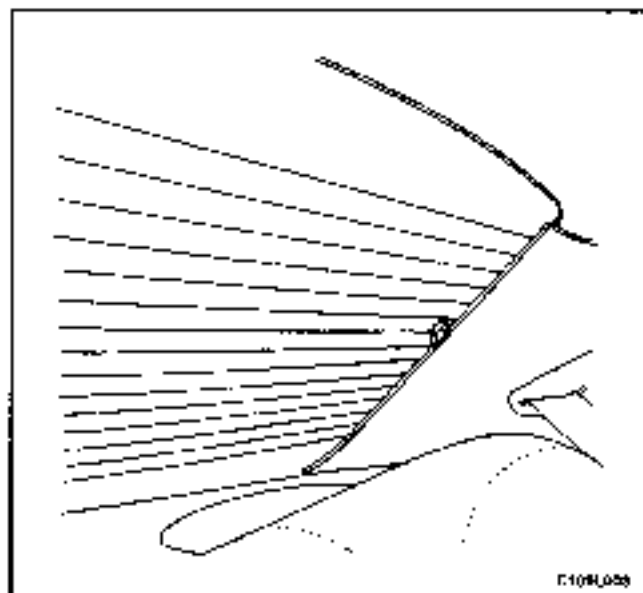


C309.004

### Installation Procedure

1. Install the new weatherstrip to the windshield
2. Apply tape to the new weatherstrip and the windshield to hold the weatherstrip in place.
3. Apply adhesive primer to the windshield frame and the perimeter of the windshield
4. Apply glass adhesive to the windshield frame.
5. Install the windshield into the windshield frame.
6. Reposition the tape over the weatherstrip, the windshield, and the windshield frame to hold the windshield in place
7. Let the adhesive dry for 24 hours.
8. Remove the tape.
9. Check for waterleaks by pouring water on the windshield. If a leak is found, dry the windshield and fill the area that leaks with adhesive. If the leak persists, remove the windshield and repeat the entire procedure.
10. Install the inside rearview mirror. Refer to "Rearview Mirror" in this section.
11. Install the cowl vent grille. Refer to Section 9R, Body Front End.





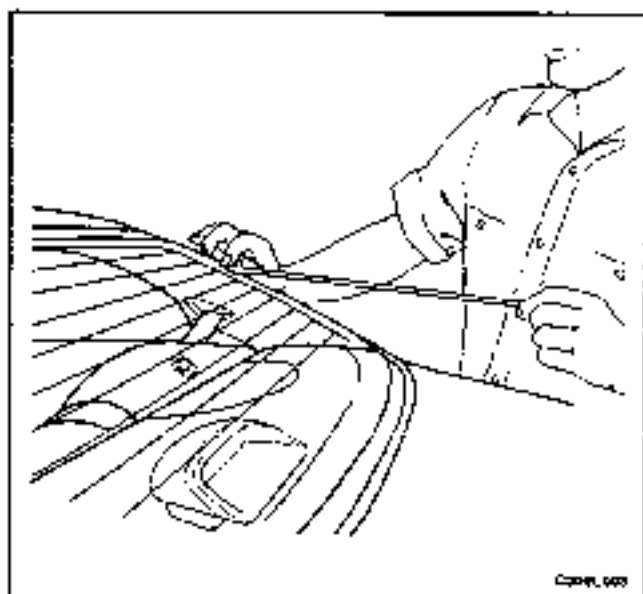
## REAR WINDOW GLASS

### Tools Required

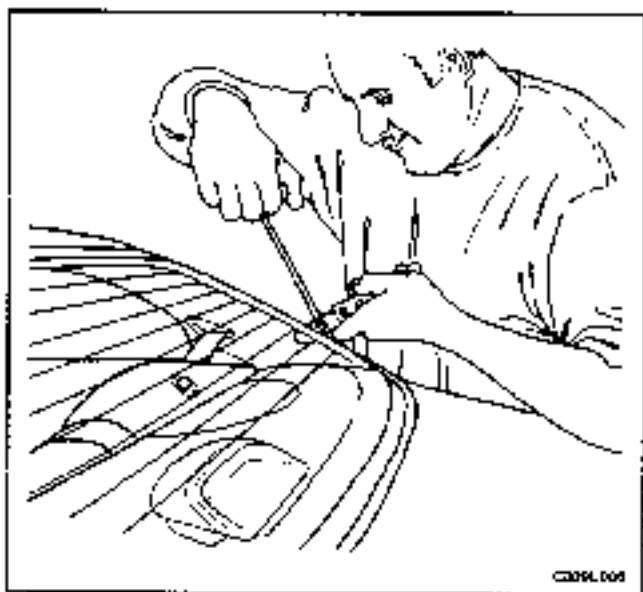
J-24402 Glass Sealant Remover

### Removal Procedure

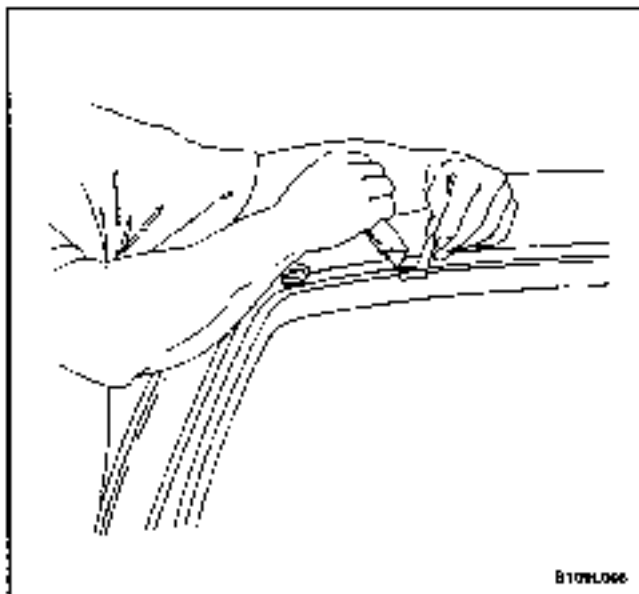
1. Disconnect the negative battery cable.
2. Disconnect the rear window defogger electrical connector.



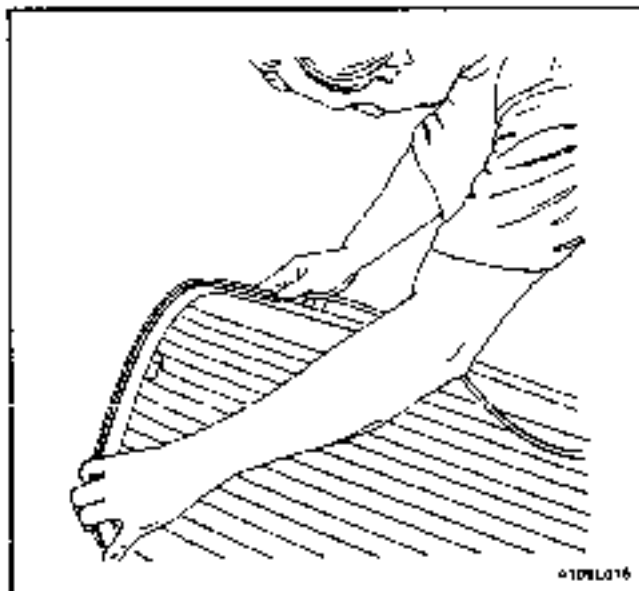
3. Remove the weatherstrip around the rear window.



4. Using the glass sealant remover J-24402, cut the adhesive around the rear window.

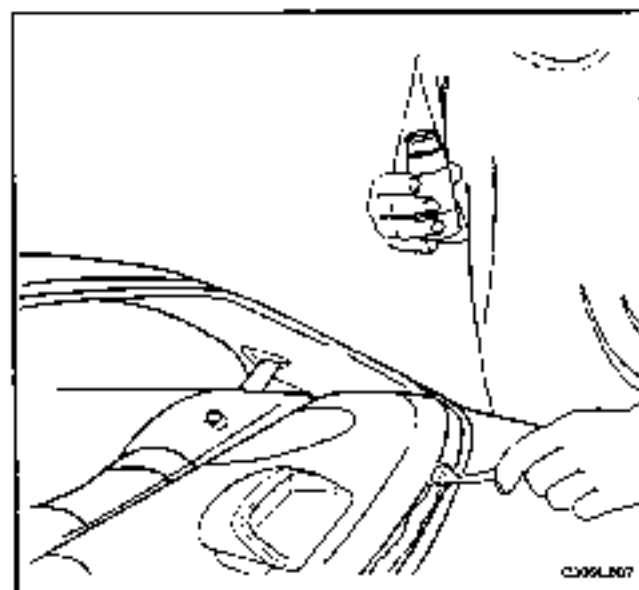


5. Remove the rear window from the vehicle.
6. Using a knife, remove the adhesive from the rear window.
7. Using a knife, remove the adhesive from the rear window frame.

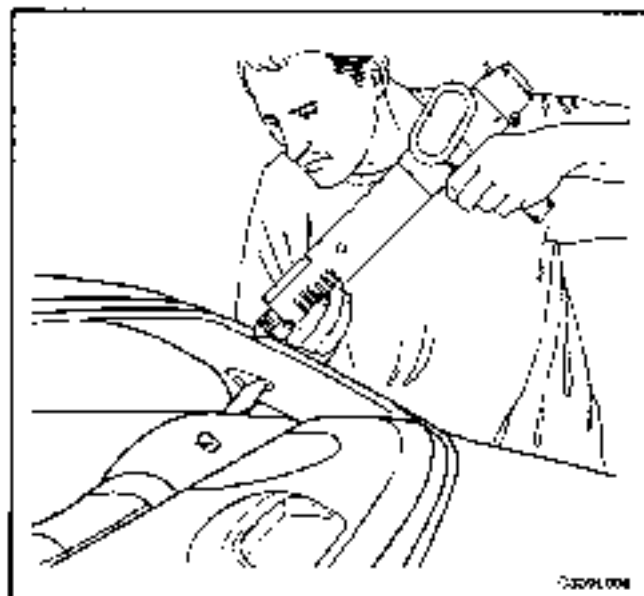


### Installation Procedure

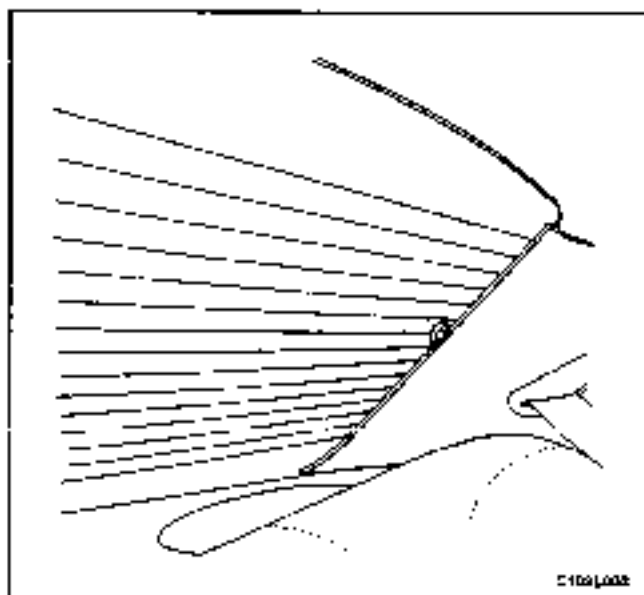
1. Install the new weatherstrip to the rear window.



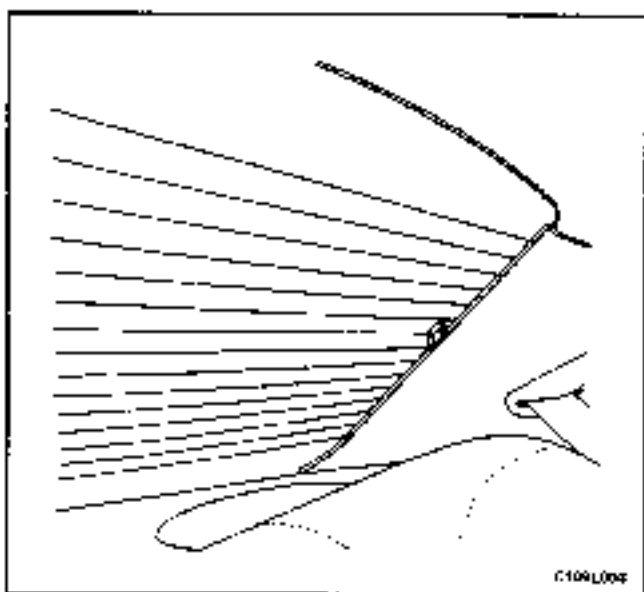
2. Apply tape to the new weatherstrip and the rear window to hold the weatherstrip in place.
3. Apply adhesive primer to the rear window frame and the perimeter of the rear window.



4. Apply glass adhesive to the rear window frame.

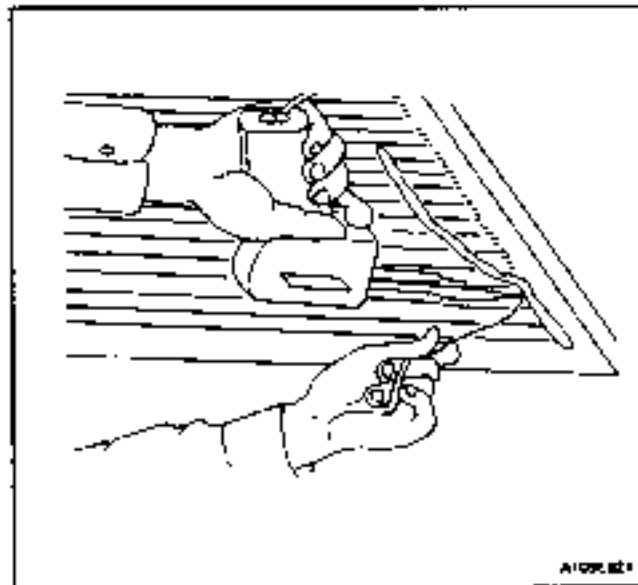
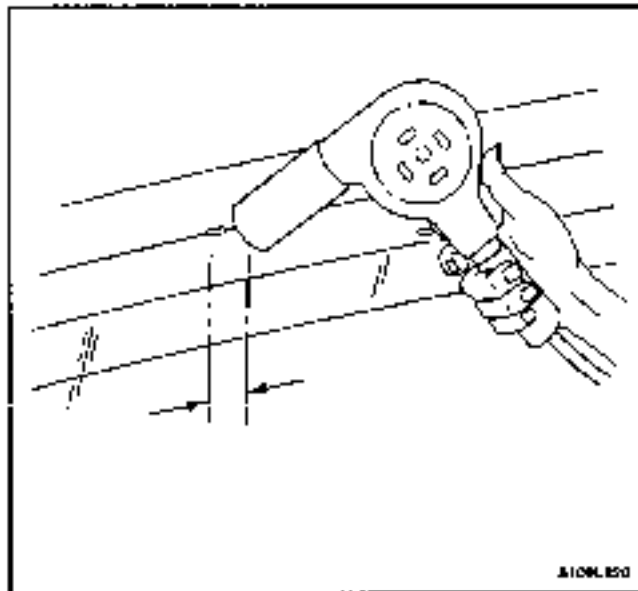
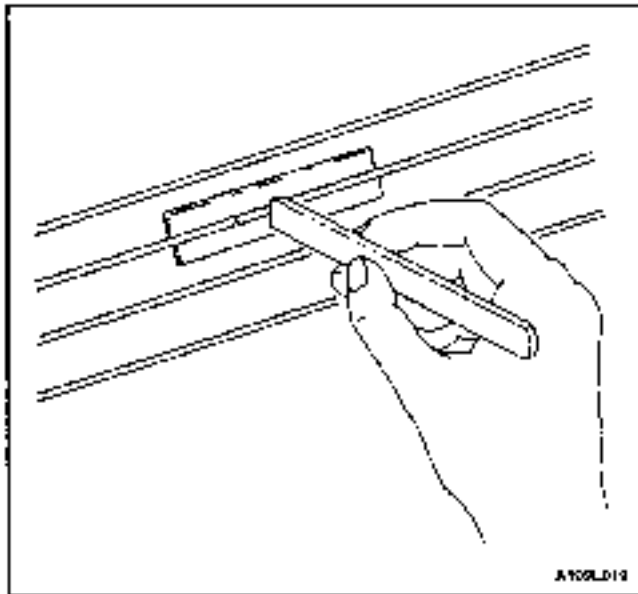


5. Install the rear window into the rear window frame.
6. Reposition the tape over the weatherstrip, the rear window, and the rear window frame to hold the rear window in place.
7. Let the adhesive dry for 24 hours.
8. Remove the tape.
9. Check for waterleaks by pouring water on the rear window. If a leak is found, dry the window and fill the area that leaks with adhesive. If the leak persists, remove the rear window and repeat the entire procedure.
10. Connect the rear window defogger electrical connector.
11. Connect the negative battery cable.



### REAR WINDOW DEFOGGER GRID LINE REPAIR

1. Disconnect the negative battery cable.
2. Disconnect the rear window defogger electrical connector.
3. Inspect the rear window defogger grid lines.
4. Mark the grid line break on the outside of the glass with a wax pencil or a crayon.
5. Buff the grid lines that are to be repaired with steel wool. Wipe the lines clean using a cloth dampened with alcohol. Buff and clean about 6 mm (0.25 inch) beyond each side of the break in the grid line.



6. Attach a grid line repair decal or two strips of tape above and below the repair areas.
  - A repair decal or tape must be used in order to control the width of the repair areas.
  - If a decal is used, the die-cut metered slot must be the same width as the grid line.
7. Apply the grid repair material to the repair area using a small wooden stick or a spatula. The grid repair material should be at room temperature.
8. Carefully remove the decal or the tape.

**Notice:** The grid line repair material must be cured with heat. In order to avoid heat damage to the interior trim, protect the trim near the repair area where heat will be applied.

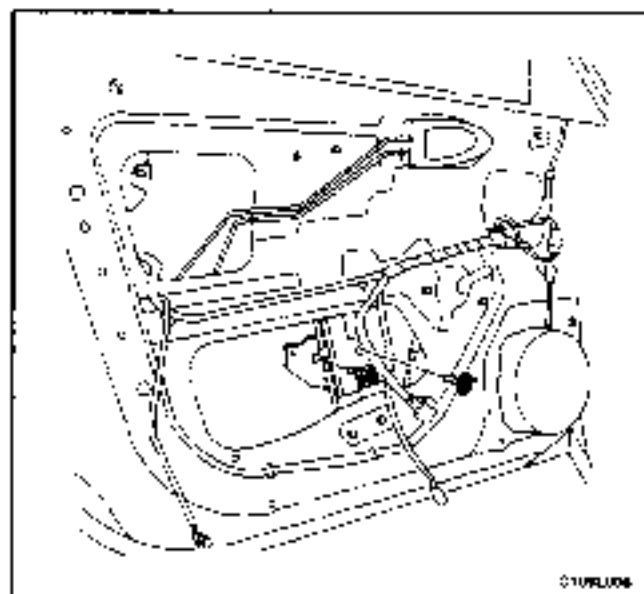
9. Heat the repair area for 1 to 2 minutes.
10. Hold the heat gun nozzle 25 mm (1 inch) from the surface. A minimum temperature of 149°C (300°F) is required.
11. Inspect the grid line repair area. If the repair appears discolored, apply a coating of tincture of iodine to the area using a pipe cleaner or a line brush. Allow the iodine to dry for about 30 seconds. Carefully wipe off the excess iodine with a lint-free cloth.
12. Test the operation of the rear window defogger in order to verify that the repair was successful.

**Important:** At least 24 hours is required for complete curing of the repair materials. The repair area should not be physically disturbed until after that time.

## REAR WINDOW DEFOGGER BRAIDED LEAD WIRE REPAIR

The rear window defogger bus lead wire or the terminal can be reattached by resoldering. Use a solder containing 3 percent silver and a rosin flux paste.

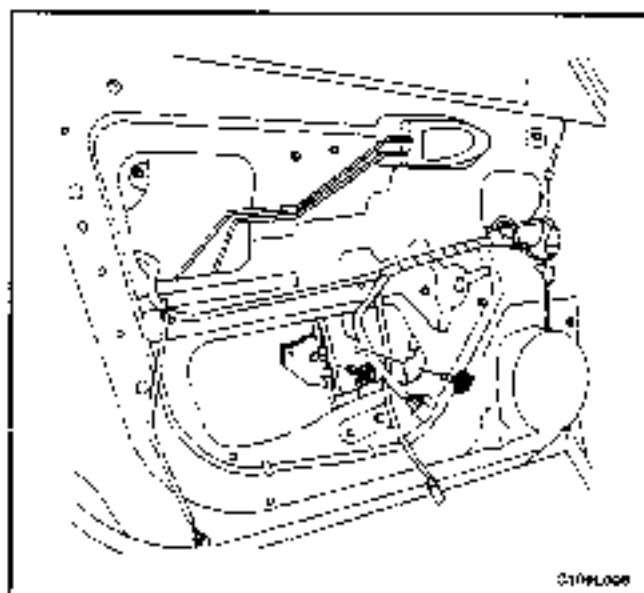
1. The repair area should be buffed with fine steel wool before soldering the bus lead wire.
2. Apply the paste-type rosin flux in small quantities to the wire lead and the bus lead wire repair area using a brush.
3. Coat the soldering iron tip with solder. Use only enough solder to ensure a complete repair.
4. Use only enough heat to melt the solder. Do not overheat the wire when resoldering to the bus lead wire.



## FRONT DOOR GLASS

### Removal Procedure

1. Remove the door seal trim. Refer to *Section 9P, Doors*.
2. Remove the B-pillar molding. Refer to *Section 9M, Exterior Trim*.
3. Remove the screws that secure the glass to the window regulator.
4. Remove the glass from the door.



### Installation Procedure

1. Install the glass in the door and position the glass within the window regulator.

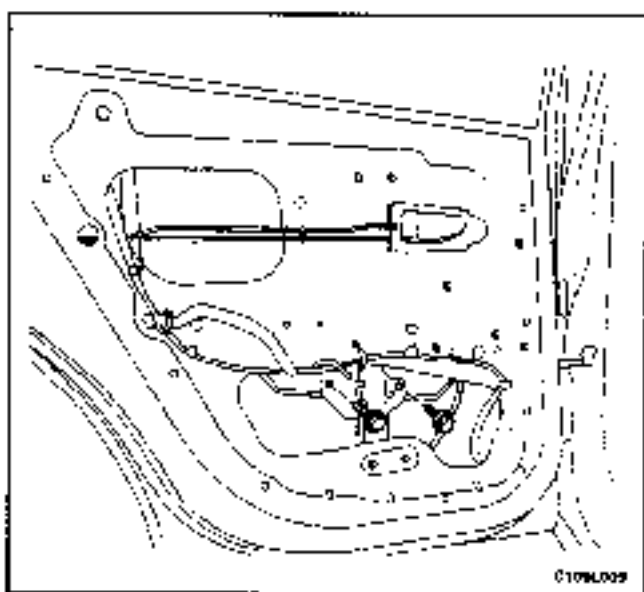
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the glass to the window regulator with the screws.

### Tighten

Tighten the glass screws to 7 N•m (62 lb-in).

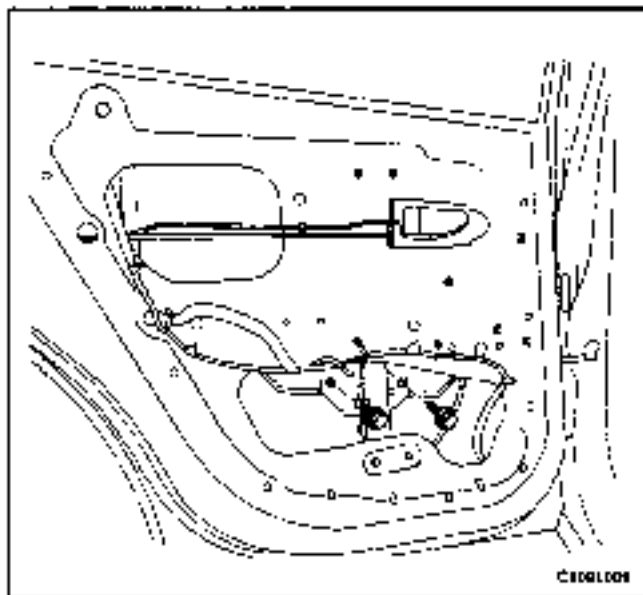
3. Install the B-pillar molding. Refer to *Section 9M, Exterior Trim*.
4. Install the door seal trim. Refer to *Section 9P, Doors*.



## REAR DOOR GLASS

### Removal Procedure

1. Remove the door seal trim. Refer to *Section 9P, Doors*.
2. Remove the exterior B-pillar molding. Refer to *Section 9M, Exterior Trim*.
3. Remove the screws that secure the glass to the window regulator.
4. Remove the glass from the door.



### Installation Procedure

1. Install the glass in the door and position the glass within the window regulator.

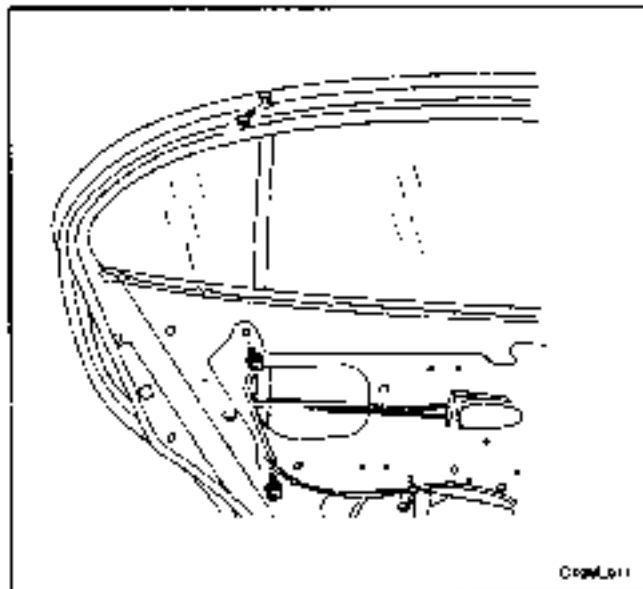
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the glass screws

#### Tighten

Tighten the glass screws to 7 N•m (62 lb-in).

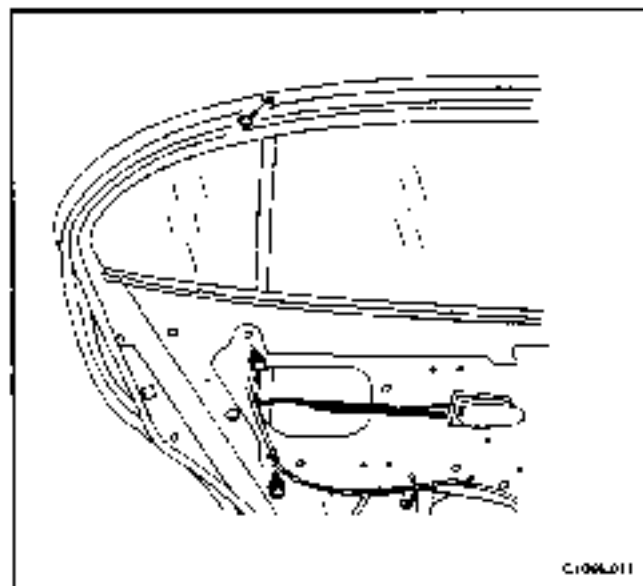
3. Install the exterior B-pillar molding. Refer to Section 9M, Exterior Trim.
4. Install the door seal trim. Refer to Section 9P, Doors.



## REAR DOOR QUARTER WINDOW

### Removal Procedure

1. Remove the rear door glass. Refer to "Rear Door Glass" in this section.
2. Remove the bolts and the screw from the rear door quarter window guide rail.
3. Remove the guide rail and the rear door quarter window.



### Installation Procedure

1. Install the guide rail and the rear door quarter window.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

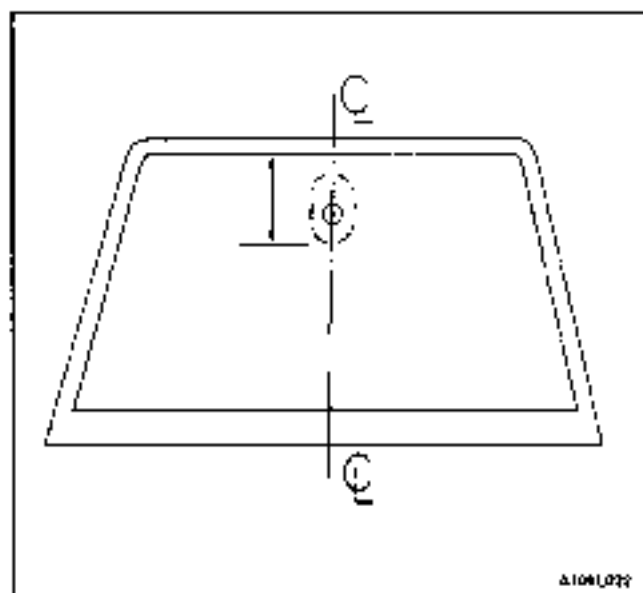
2. Install the rear door quarter window guide rail bolts and the screw

#### Tighten

Tighten the rear door quarter window guide rail bolts to 7 N•m (62 lb-in).

Tighten the rear door quarter window guide rail screw to 4 N•m (35 lb-in).

3. Install the rear door glass. Refer to "Rear Door Glass" in this section.



## REARVIEW MIRROR

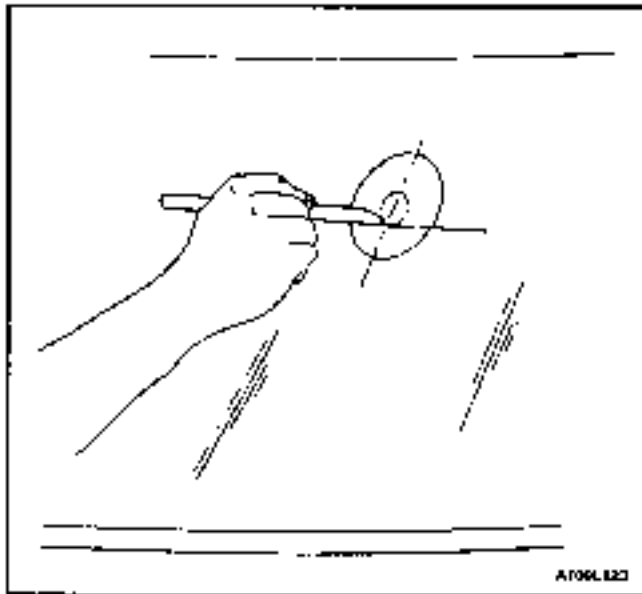
The inside rearview mirror is attached to a support which is secured to the windshield glass. The support is installed by the glass supplier using a plastic-polyvinyl butyl adhesive.

Service replacement windshield glass has the mirror support bonded to the glass assembly. In order to install a detached mirror support or to install a new part, the following items will be needed:

- ◆ Loctite<sup>®</sup> Minu-Bond Adhesive.
- Original or replacement mirror support.
- ◆ Wax marking pencil or crayon.
- ◆ Rubbing alcohol.
- Clean paper towel.
- ◆ Fine grit sandpaper (grit #320 or #360).
- 2 mm allen wrench

### Installation Procedure

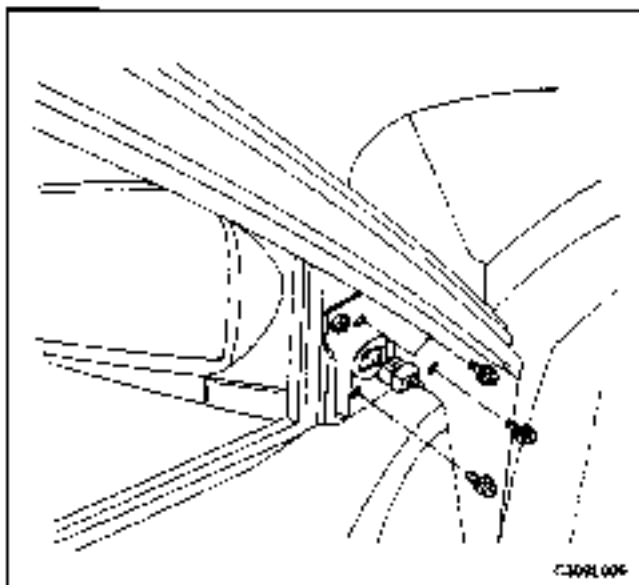
- 1 Measure the distance from the headliner to the bottom of the location where the mirror support will be mounted on the windshield.



2. Mark this position on the outside of the glass with a wax pencil or crayon. Draw a large diameter circle around the mirror support location on the outside of the glass.
3. Clean the inside surface of the glass with a domestic scouring cleanser, a glass cleaning solution, or a polishing compound and paper towels. Rub the glass until the area is completely dry. When the area is dry, clean the area with an alcohol-saturated paper towel in order to remove any traces of the scouring powder or the glass cleaning solution.
4. If the mirror support is new, clean the bonding surface with fine grit sandpaper #320 or #360. If the original mirror support is being used, all traces of factory-installed adhesive must be removed prior to reinstallation.
5. Wipe the sanded mirror support with a clean paper towel saturated with rubbing alcohol. Allow the support to dry.
6. Follow the adhesive kit manufacturer's directions for adhesive application and mirror support preparation before installing the mirror support to the glass.
7. Position the mirror support to its premarked position. Use steady pressure and press the support against the glass for 30 to 60 seconds.
8. After 5 minutes, remove the excess adhesive with an alcohol-moistened towel or a glass-cleaning solution.
9. Install the inside rearview mirror to the mirror support with the mounting screw.

### Tighten

Tighten the rearview mirror mounting bolt to 1.2 Nm (11 lb-in).

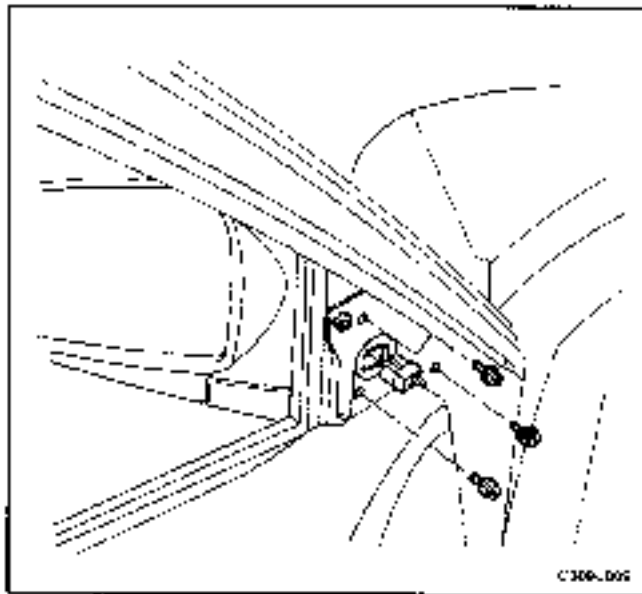


## ELECTRIC CONTROL OUTSIDE REARVIEW MIRRORS

### Removal Procedure

1. Remove the front door escutcheon.
2. Disconnect the mirror electrical connector.
3. Remove the bolts and the outside rearview mirror assembly from the door.





### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the outside rearview mirror assembly to the door with the screws.

### Tighten

Tighten the outside rearview mirror assembly screws to 6 N•m (53 lb-in).

2. Connect the mirror electrical connector.
3. Install the front door escutcheon.

## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **STATIONARY GLASS**

Stationary glass consists of all the glass on the vehicle which is immovable within its frame, such as the windshield glass, the back glass, and the inside rearview mirror.

### **ELECTRIC CONTROL HEATED OUTSIDE REARVIEW MIRRORS**

Electric control heated outside rearview mirrors are standard. The electric control is located on the driver door. The mirror defogger is activated when the rear window defogger switch is turned on.

### **INSIDE REARVIEW MIRROR**

The rearview mirror pivots at the ball-and-socket mirror pivot and can be manually adjusted up/down and left/right.

## SECTION 9M

# EXTERIOR TRIM

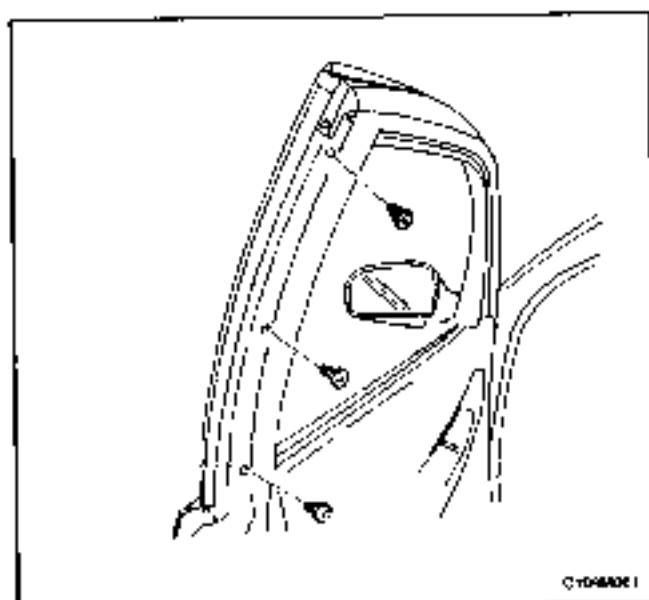
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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
B-Pillar Molding Screws	4	-	35
Mud Guard Bolts	2	-	18



C1048001

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### B-PILLAR MOLDING

##### Removal Procedure

1. Reposition the weatherstrip in order to access the screws.
2. Remove the screws and the B-pillar molding (front door B-pillar molding shown, rear door B-pillar molding similar).

##### Installation Procedure

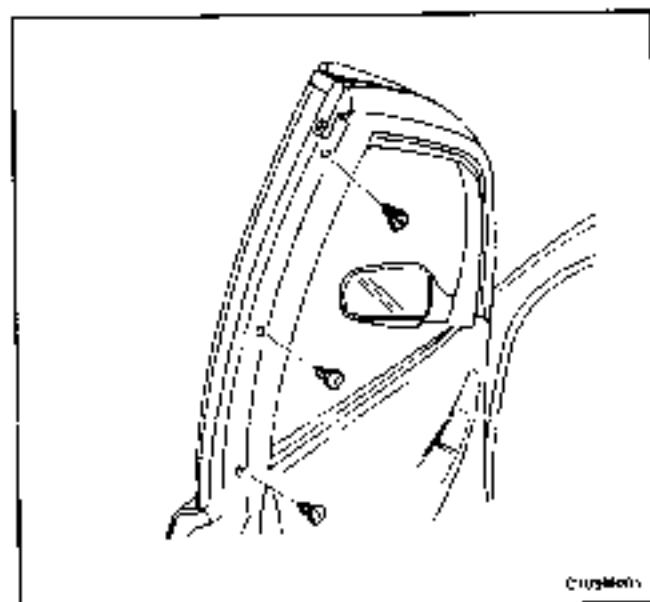
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the screws and the B-pillar molding (front door B-pillar molding shown, rear door B-pillar molding similar).

##### Tighten

Tighten the B-pillar molding screws to 4 N·m (35 lb·in).

2. Install the weatherstrip to its original position.

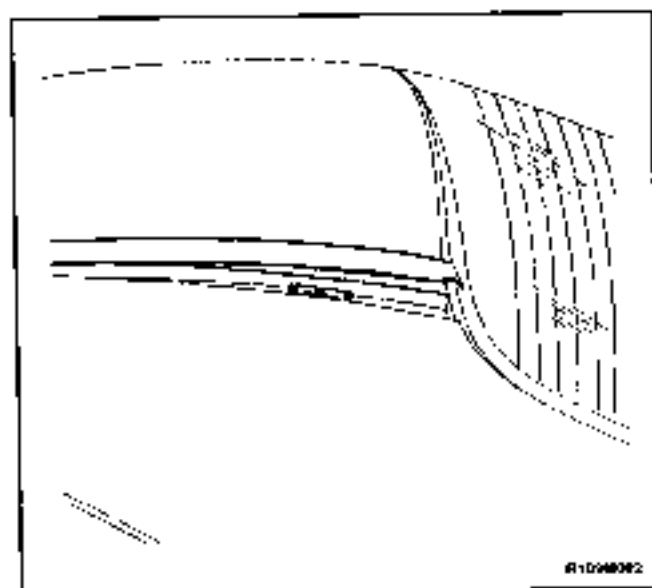


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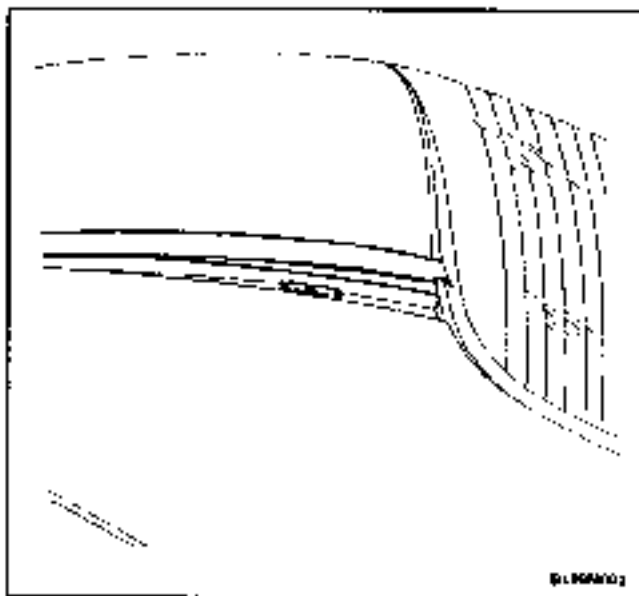
#### ROOF MOLDING

##### Removal Procedure

1. Remove the roof molding from the metal clips.

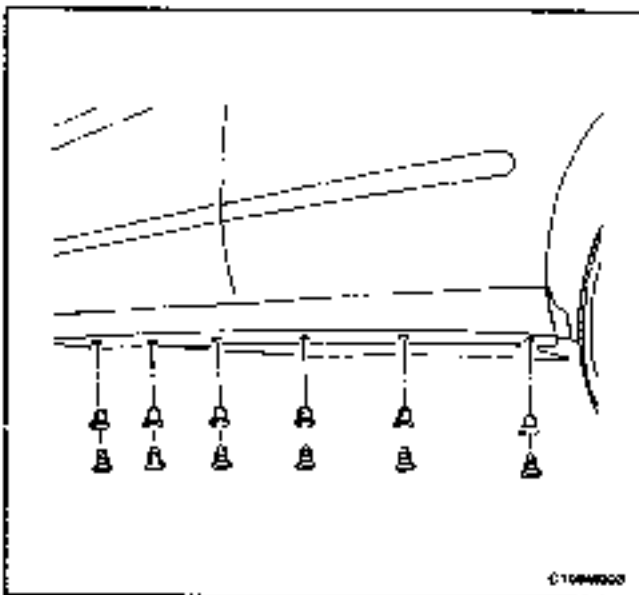


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### Installation Procedure

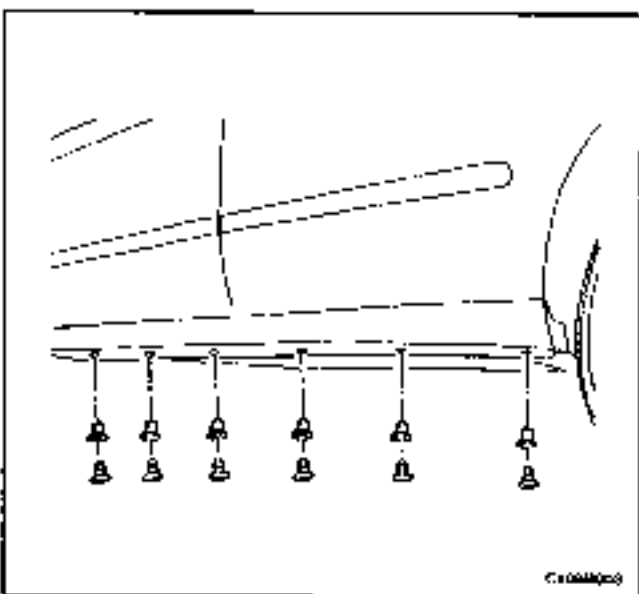
1. Press the roof molding onto the metal clips



### ROCKER PANEL MOLDING

#### Removal Procedure

1. Remove the front mud guards. Refer to "Mud Guards" in this section.
2. Remove the screws and the rocker panel molding.



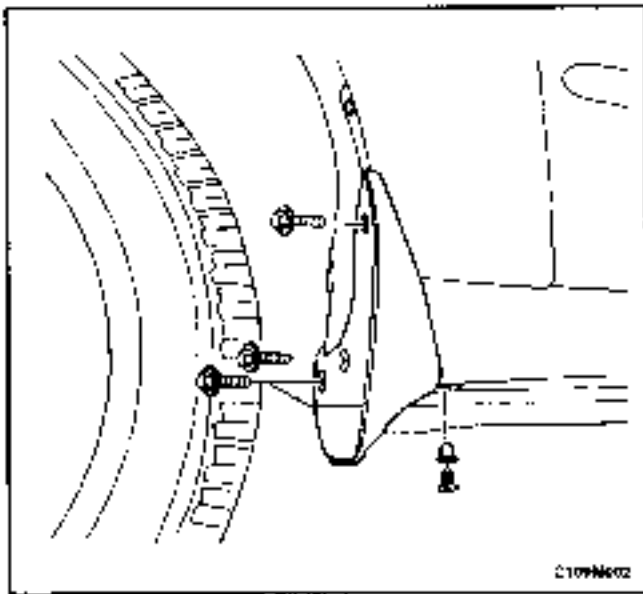
#### Installation Procedure

1. Install the rocker panel molding with the screws.
2. Install the front mud guards. Refer to "Mud Guards" in this section.

## MUD GUARDS

### Removal Procedure

1. Remove the screw and the bolts and the mud guard.



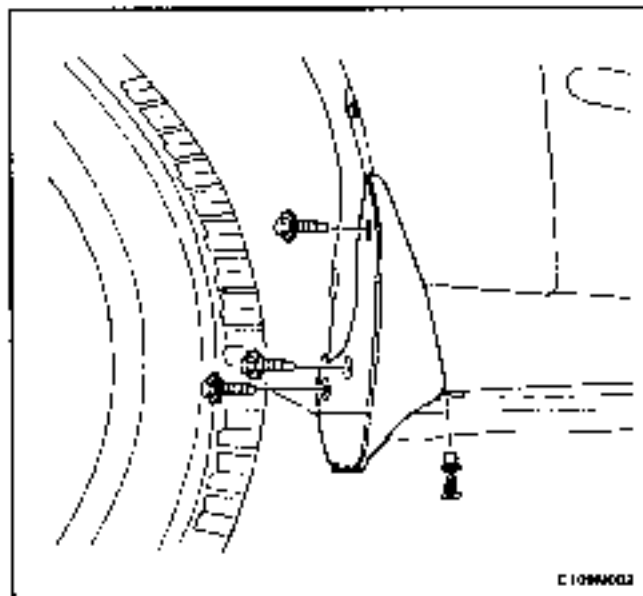
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the mud guard with the bolts and the screw.

### Tighten

Tighten the mud guard bolts to 2 N•m (18 lb•ft).



## GENERAL DESCRIPTION AND SYSTEM OPERATION

### EMBLEMS AND LETTERING

The emblems and lettering on the vehicle are attached by adhesive. The company emblem appears on the hood. The lettering which appears in several places on

the body of the vehicle, features the model, the grade, and the company name.

### MUD GUARDS

Front and rear mud guards are standard equipment on all models. Mud guards will help prevent an excessive buildup of mud on the body.





## SECTION 9N

# FRAME AND UNDERBODY

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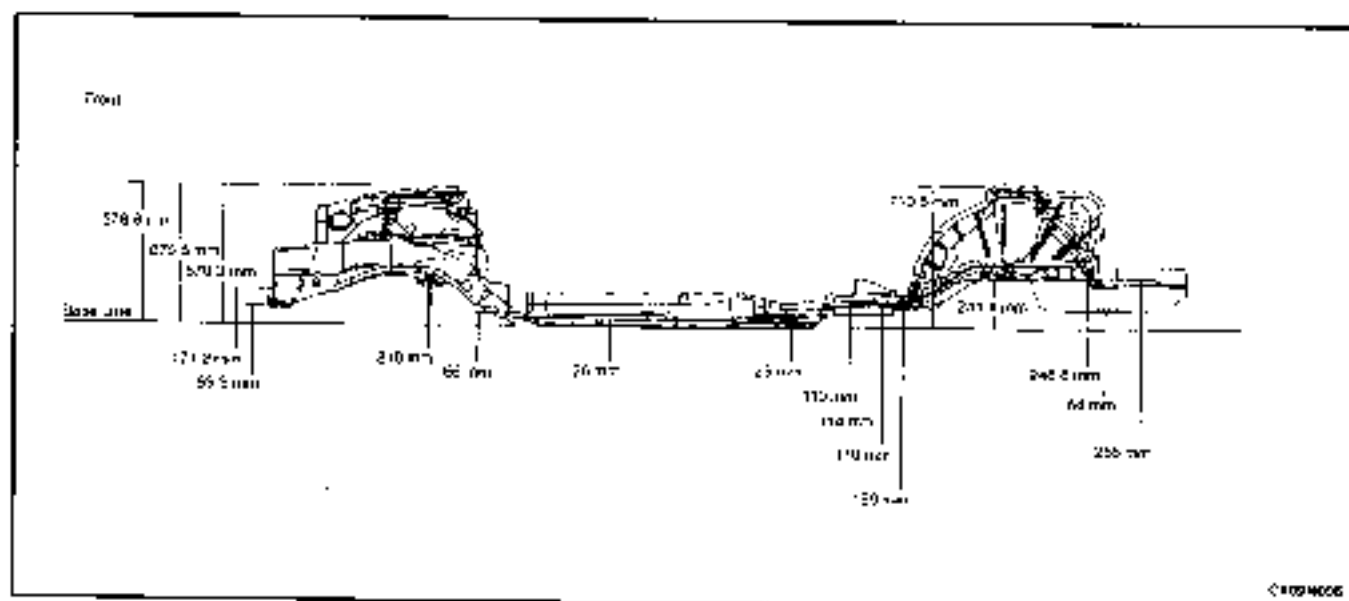
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## SPECIFICATIONS

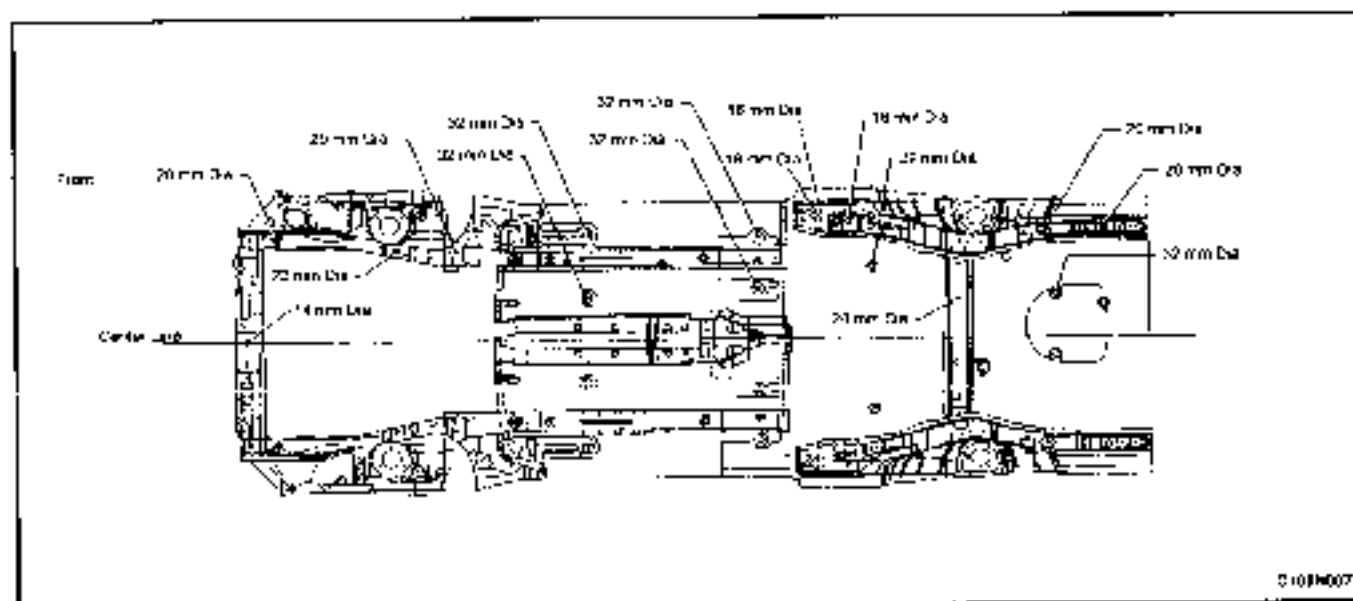
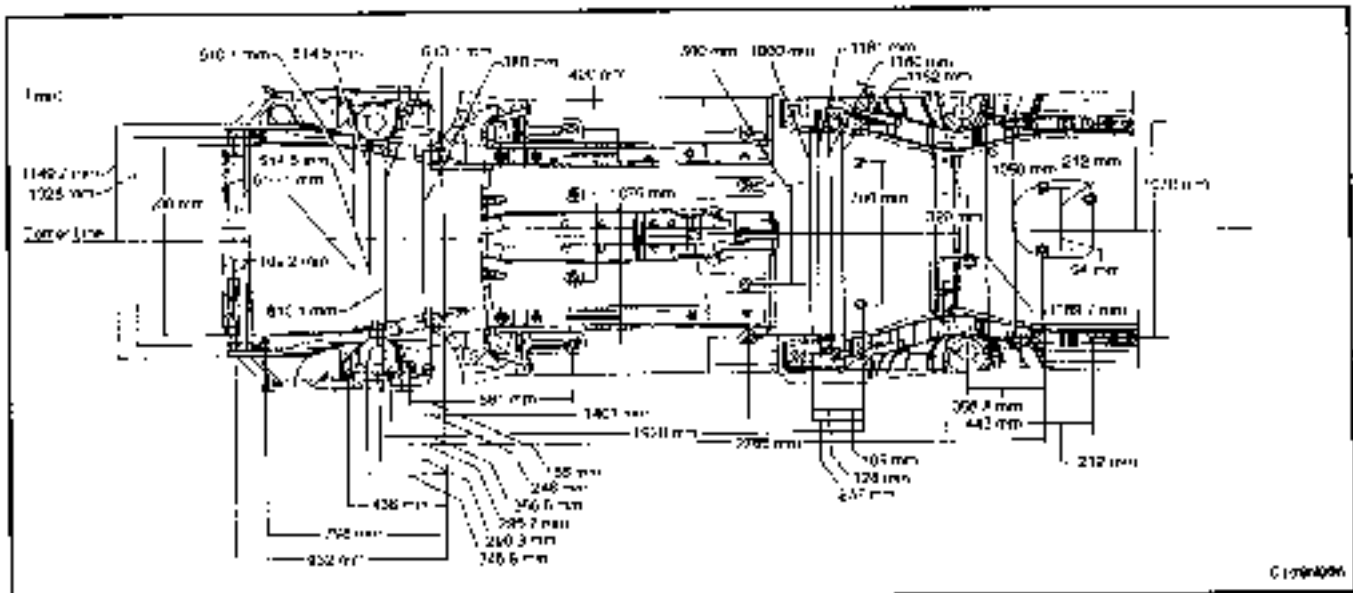
### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Center Member-to-Crossmember Bolt	30	66	-
Center Member-to-Radiator Bolt	90	66	-
Engine Under Cover Bolts	10	-	89
Forward Engine Mount Through-Bolt	80	59	-
Rear Engine Mount Through-Bolt	80	59	-

### UNDERBODY DIMENSIONS



# 9N - 2 FRAME AND UNDERBODY



## MAINTENANCE AND REPAIR ON-VEHICLE SERVICE

### ALIGNMENT CHECKING

An accurate method of determining the alignment of the underbody uses a measuring tram gauge. The tram gauge set used to perform the recommended measuring checks must include a vertical pointer able to reach 457 mm (18 inches).

Two types of measurements can be made with a tram gauge: direct point-to-point measurements and measurements calculated on a horizontal plane (datum line) parallel to the underbody. Point-to-point measurements are generally taken on steering and suspension engine compartment parts and simply require the vertical pointers to be set equally.

For horizontal plane measurements, the vertical pointers must be set as specified for each point to be measured.

Dimensions-to-gauge holes are measured to the center of the holes and flush to the adjacent surface metal unless otherwise specified. It is recommended that the diagonal dimensions to the cross-body be checked on both sides in order to verify the dimensional accuracy of the vehicle underbody.

### FLOOR PAN INSULATORS

The floor pan insulators have been designed for the higher floor pan temperatures that result from the use of the catalytic converter in the exhaust system. Therefore, when servicing a vehicle, it is essential that any insulators that may have been disturbed or removed be reinstalled in the original sequence and location. Also, if an insulator needs to be replaced, use only the insulation specified for that location on the floor pan.

When servicing or replacing interior insulators, observe the following instructions.

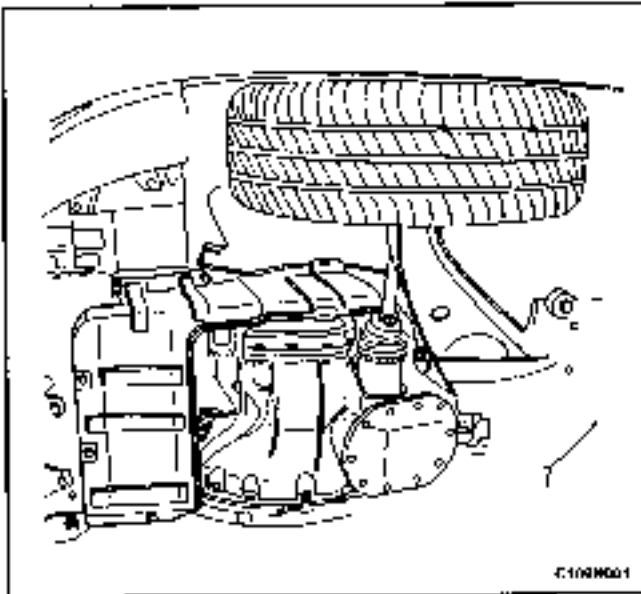
- Install the insulators in the original position and sequence. Butt the pieces together in order to avoid gapping or overlapping.
- If it is necessary to replace an insulator, use only the specified insulation.
- Use the original part to determine the amount of replacement material required and as a template for cutting and fitting the new piece to the floor pan.
- When installing the insulator, do not enlarge any cut-outs or holes that are used for the attachment of interior parts such as the instrument panel or the floor console.
- Route the cross-body harness for interior parts over the floor pan insulators. Clip it in the original location.
- Do not apply spray-on deodorizers or trim adhesives to the top of the floor pan at the area directly over the catalytic converter or the muffler.

Any insulator service repair or replacement should be the same thickness, size, and location as the original installation in the vehicle.

## ENGINE UNDER COVERS

### Removal Procedure

1. Raise and suitably support the vehicle.
2. Remove the bolts and the engine under cover.



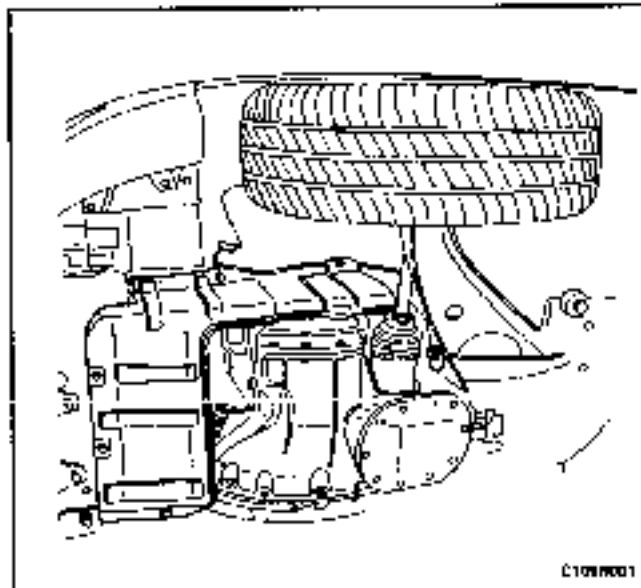
### Installation Procedure

1. Install the engine under cover with the bolts.

#### Tighten

Tighten the engine under cover bolts to 10 N·m (89 lb·ft)

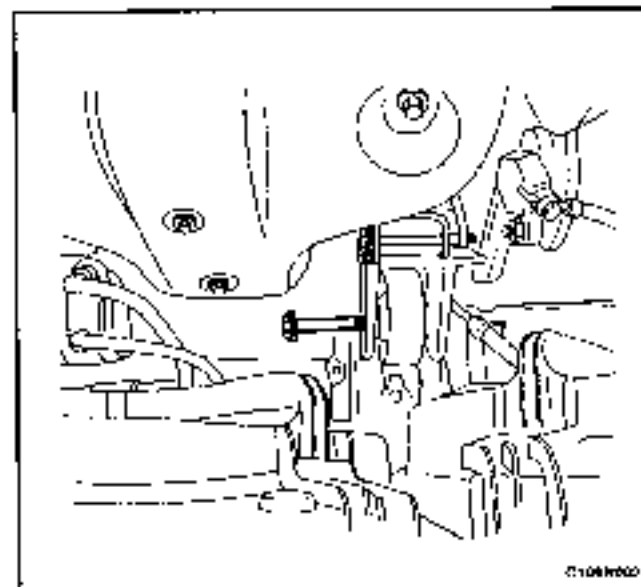
2. Lower the vehicle.

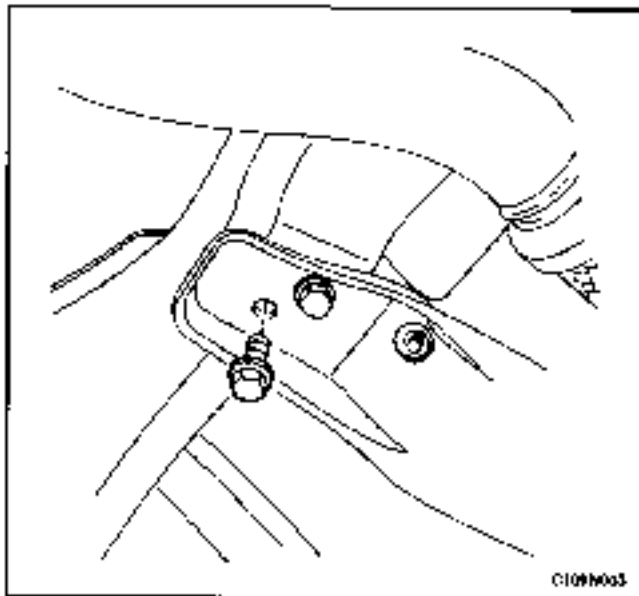


## CENTER MEMBER

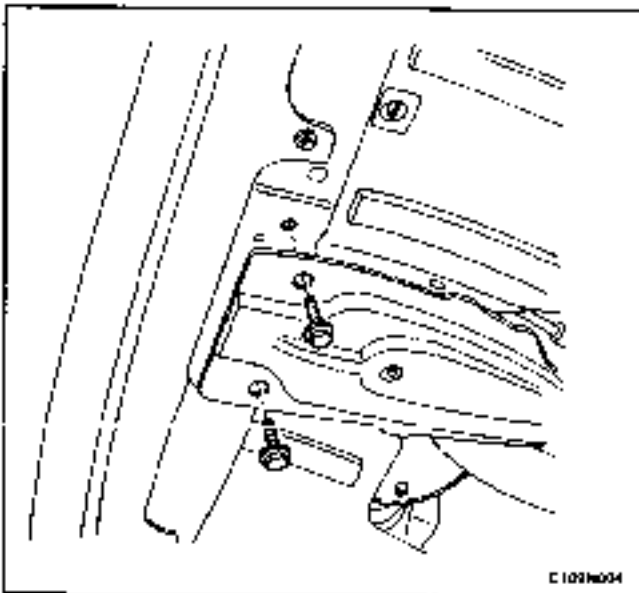
### Removal Procedure

1. Remove the engine under covers. Refer to "Engine Under Covers" in this section.
2. Remove the screws and reposition the power steering return line.
3. Remove the forward engine mount through-bolt.





4. Remove the rear engine mount through-bolt.
5. Remove the bolts and the center member (center member-to-crossmember bolt shown).



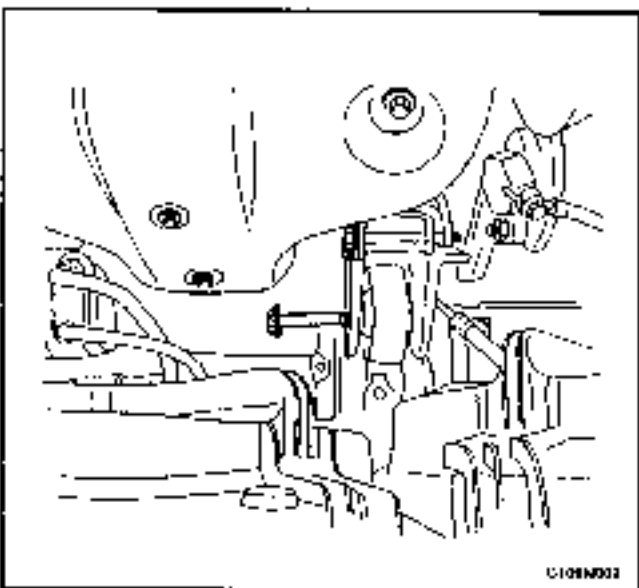
### Installation Procedure

1. Install the center member with the bolts (center member-to-radiator bolt shown).

#### Tighten

Tighten the center member-to-crossmember bolt to 90 N·m (66 lb-ft).

Tighten the center member-to-radiator bolt to 90 N·m (66 lb-ft).



2. Install the rear engine mount through-bolt.

#### Tighten

Tighten the rear engine mount through-bolt to 80 N·m (59 lb-ft).

3. Install the forward engine mount through-bolt.

#### Tighten

Tighten the forward engine mount through-bolt to 80 N·m (59 lb-ft).

4. Install the power steering return line to its original position and install the screws.
5. Install the engine under covers. Refer to "Engine Under Covers" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### GENERAL BODY CONSTRUCTION

This vehicle is constructed with a unitized body which incorporates integral front and rear frame side rails.

The front suspension lower control arms are bolted to and retained by supports, one each on the right and left sides. The front suspension lower control arm supports are attached to the underbody with three bolts at two locations. The engine is bolted to the integral front side rails. The suspension strut lowers must be dimensionally correct in relation to the remainder of the underbody in order to maintain specified suspension strut and caster/camber angles.

Since the individual underbody parts contribute directly to the overall strength of the body, it is essential to observe proper welding techniques during service repair operations. The underbody parts should be properly sealed and rustproofed whenever body repair operations destroy or damage the original sealing and rustproofing. When rustproofing critical underbody parts, use a good-quality type of air-dry primer, such as a corrosion-resistant chromate or an equivalent material. Combination-type primer/surfacers are not recommended.

### ENGINE UNDER COVERS

The engine under covers are molded pieces of plastic that serve as shields for the underside of the engine. The covers help protect the engine from small rocks, gravel and other objects that would otherwise come into contact with the engine during normal driving conditions.

## SECTION 90

# BUMPERS AND FASCIAS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

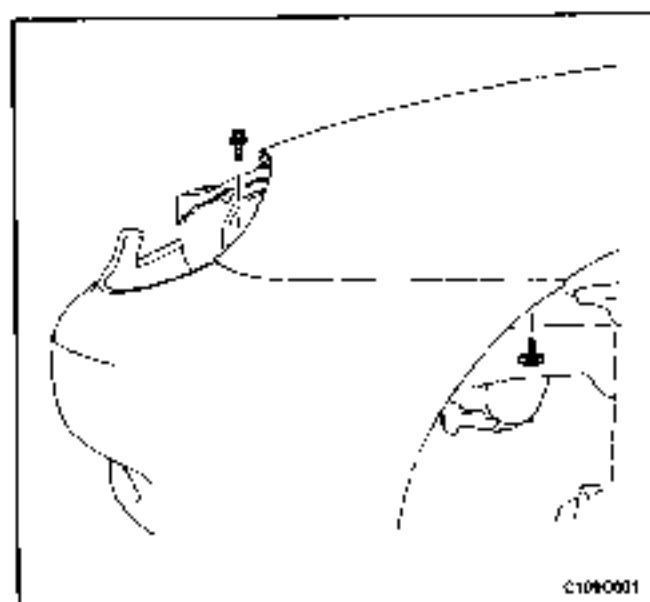
Application	N·m	Lb·Ft	Lb·In
Fender-to-Fascia Bolts	10	-	89
Fender-to-Fascia Screws	2.5	-	22
Front Impact Bar Bolts	39	29	-
Lower Fascia Bolts	10	-	89
Luggage Compartment Fascia Bolts	2	-	18
Rear Impact Bar Nuts	9	-	80
Rear Wheel Well Fascia Bolts	2	-	18
Rear Wheel Well Splash Shield Bolts	2	-	18

**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****FRONT BUMPER FASCIA****Removal Procedure**

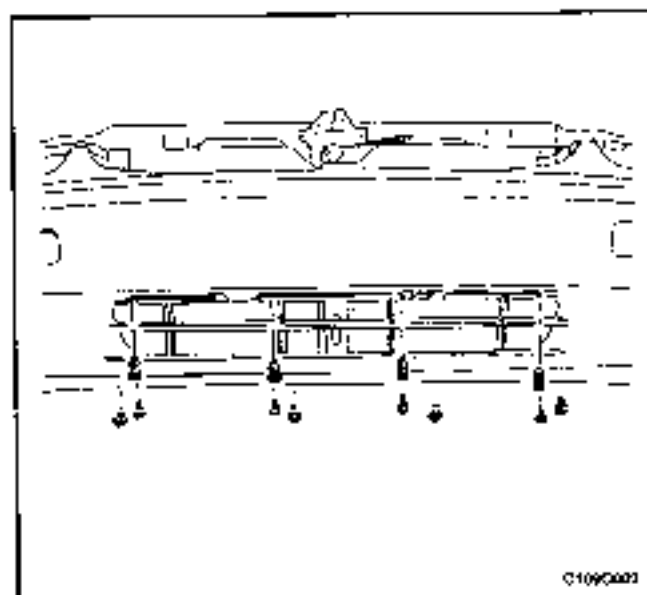
1. Disconnect the negative battery cable
2. Remove the front wheel well splash shields. Refer to Section 9A, *Body Front End*.
3. Remove the turn signal lamps, the fog lamps, and the headlamps. Refer to Section 9B, *Lighting Systems*
4. Remove the fender-to-fascia bolts and the screws.

5. Remove the lower fascia screws and the bolts

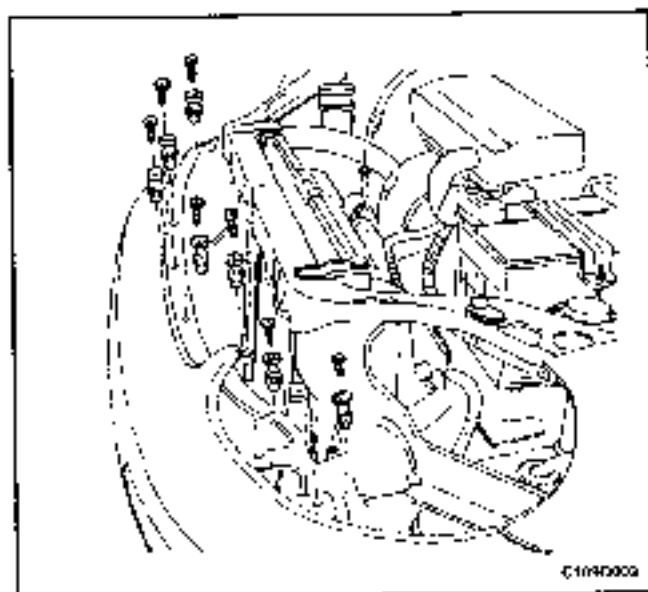
6. Remove the upper fascia screws.
7. Remove the front bumper fascia.



C109C001

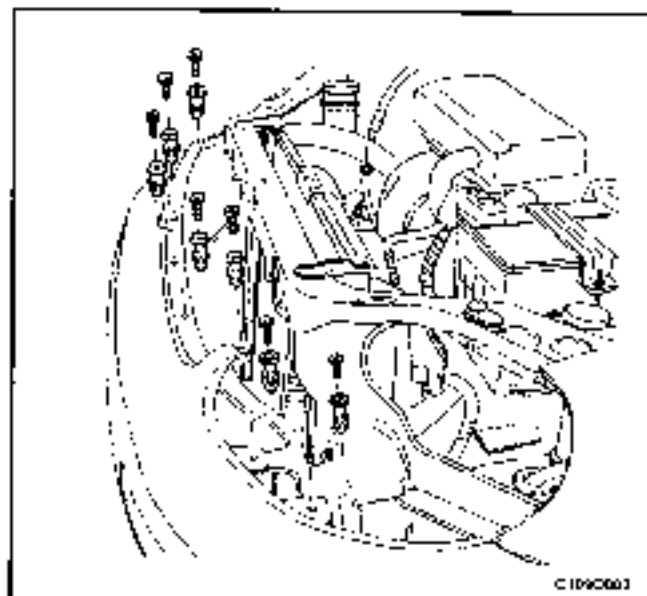


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C109D002





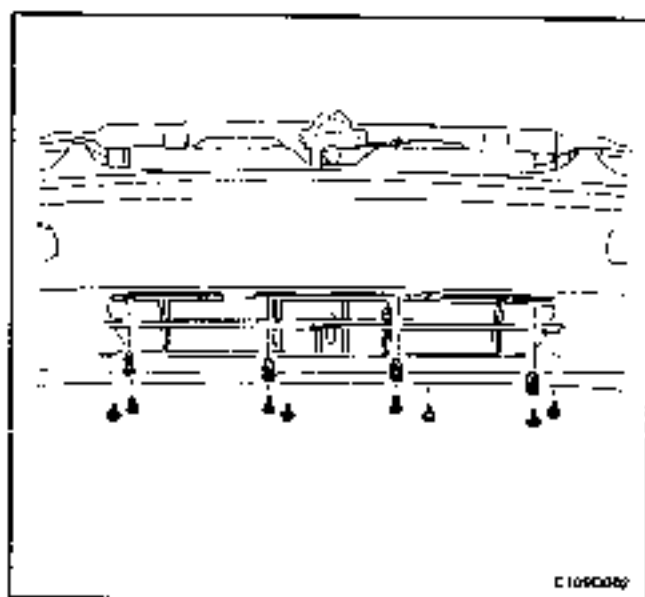
C1090003

### Installation Procedure

1. Install the front bumper fascia.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the upper fascia screws.

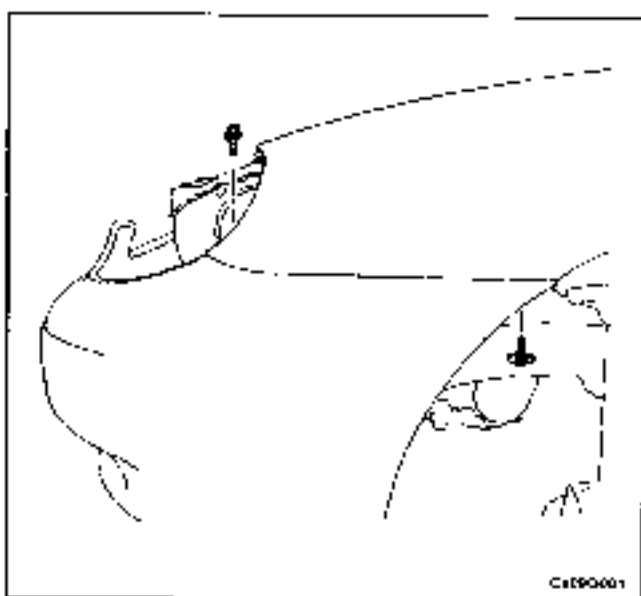


C1090004

3. Install the lower fascia screws and the bolts.

#### Tighten

Tighten the lower fascia bolts to 10 N·m (89 lb-in).



C1090005

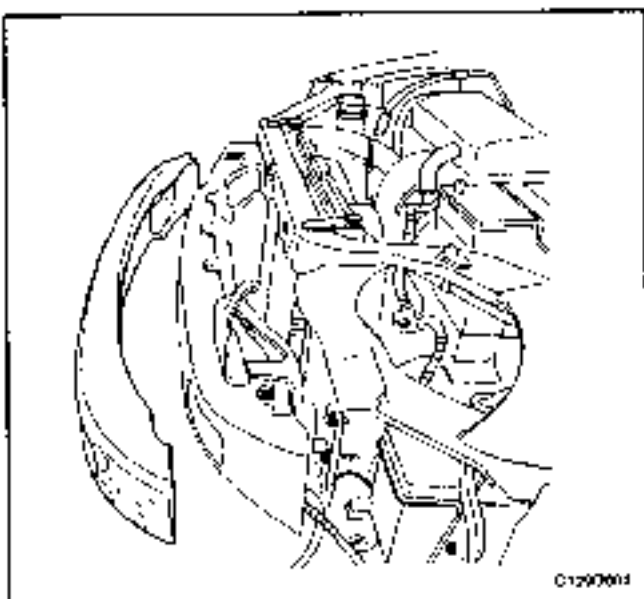
4. Install the fender-to-fascia bolts and the screws.

#### Tighten

Tighten the fender-to-fascia bolts to 10 N·m (89 lb-in).

Tighten the fender-to-fascia screws to 2.5 N·m (22 lb-in).

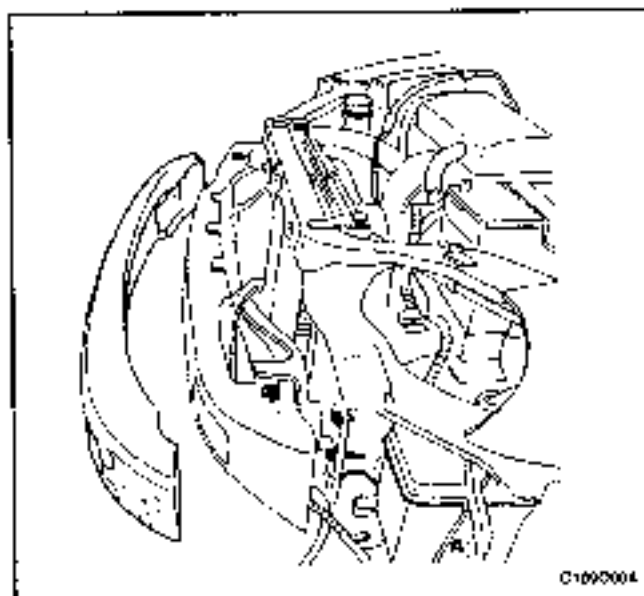
5. Install the headlamps, the fog lamps, and the turn signal lamps. Refer to *Section 9R, Lighting Systems*.
6. Install the front wheel well splash shields. Refer to *Section 9R, Body Front End*.
7. Connect the negative battery cable.



## FRONT BUMPER ENERGY ABSORBER

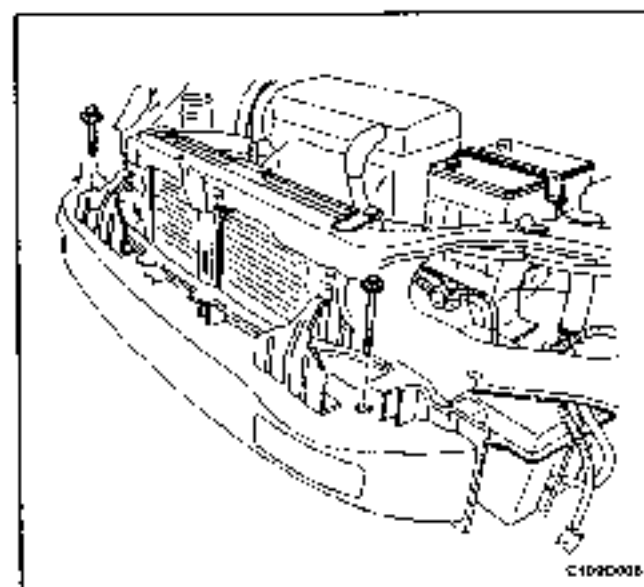
### Removal Procedure

1. Remove the front bumper fascia. Refer to "Front Bumper Fascia" in this section.
2. Remove the energy absorber.



### Installation Procedure

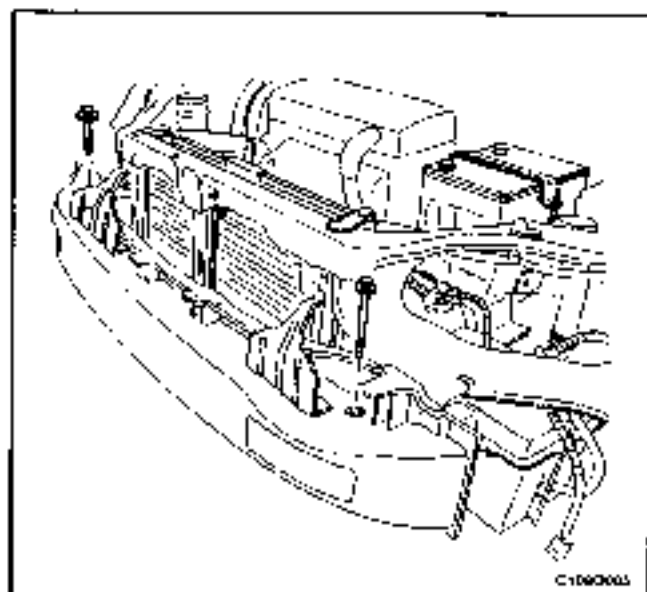
1. Install the energy absorber.
2. Install the front bumper fascia. Refer to "Front Bumper Fascia" in this section.



## FRONT BUMPER IMPACT BAR

### Removal Procedure

1. Remove the front bumper fascia. Refer to "Front Bumper Fascia" in this section.
2. Remove the front bumper energy absorber. Refer to "Front Bumper Energy Absorber" in this section.
3. Disconnect the electrical connector.
4. Remove the bolts and the front bumper impact bar.



### Installation Procedure

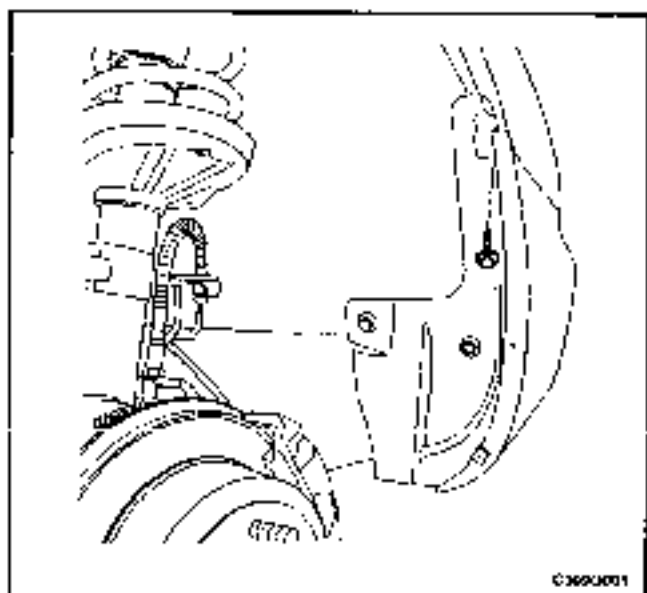
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the front impact bar with the bolts.

#### Tighten

Tighten the front impact bar bolts to 39 N•m (29 lb-ft).

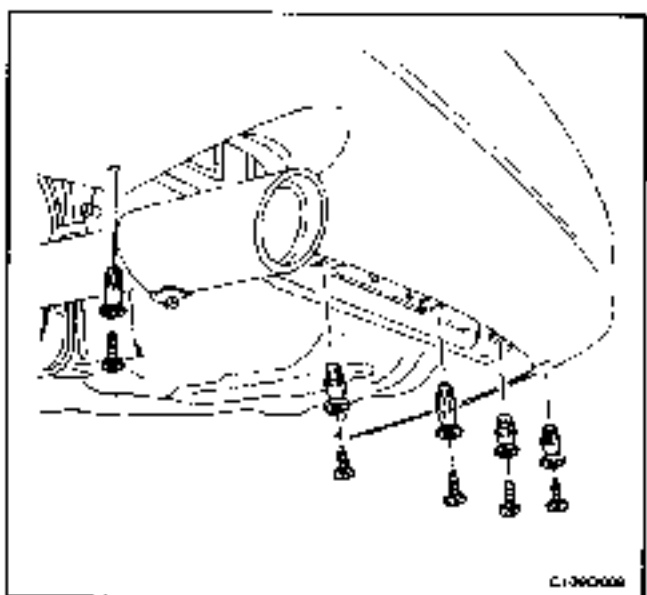
2. Connect the electrical connector.
3. Install the front bumper energy absorber. Refer to "Front Bumper Energy Absorber" in this section.
4. Install the front bumper fascia. Refer to "Front Bumper Fascia" in this section.



### REAR BUMPER FASCIA

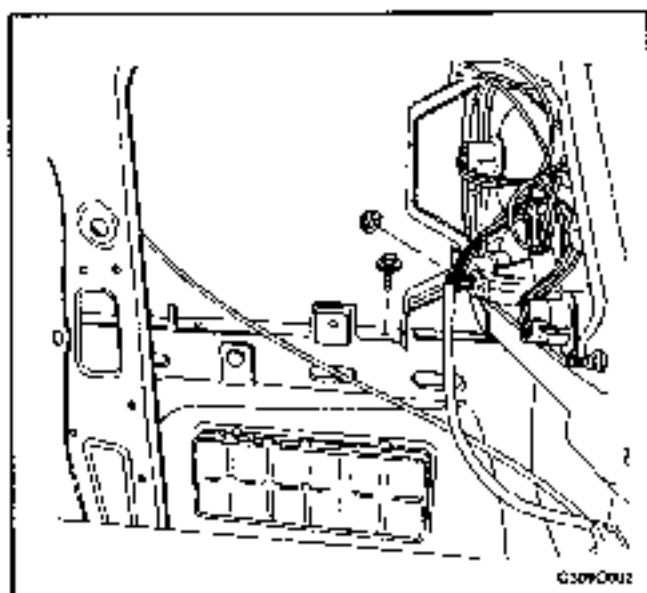
#### Removal Procedure

1. Remove the rear wheels. Refer to Section 2E, Tires and Wheels.
2. Remove the rear wheel mud guards. Refer to Section 9M, Exterior Trim.
3. Remove the fascia bolts at the top of the rear wheel wells.

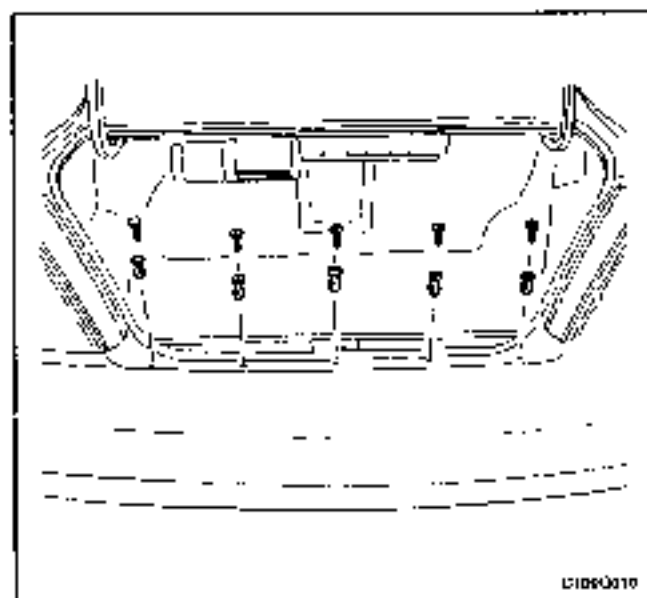


4. Remove the lower fascia screws.

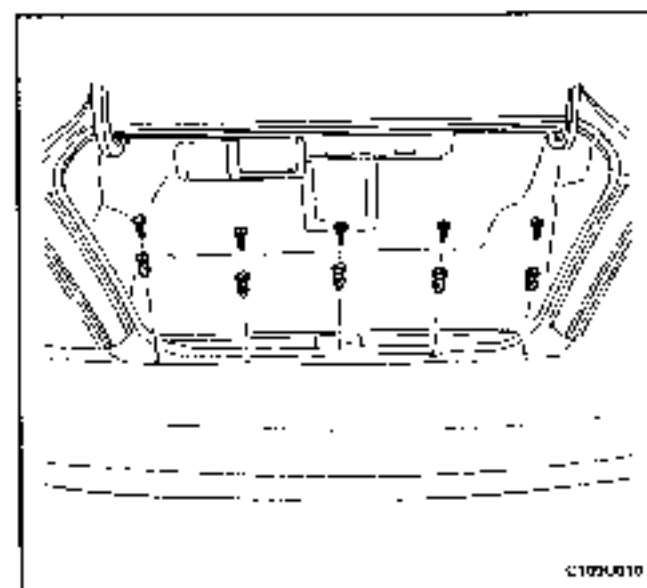
## 90 - 5 BUMPERS AND FASCIAS



5. Remove the luggage compartment wheelhouse trim pane. Refer to *Section 9G, Interior Trim*.
6. Remove the fascia bolts in the luggage compartment.

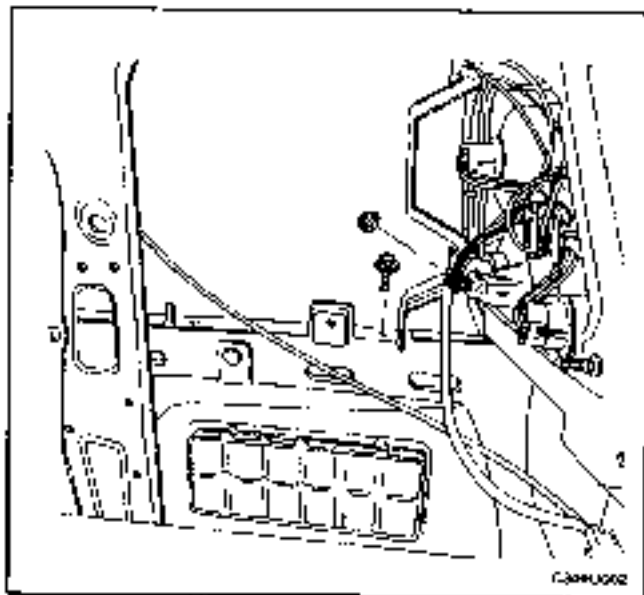


7. Remove the upper fascia screws
8. Remove the fascia



### Installation Procedure

1. Install the fascia.
2. Install the upper fascia screws

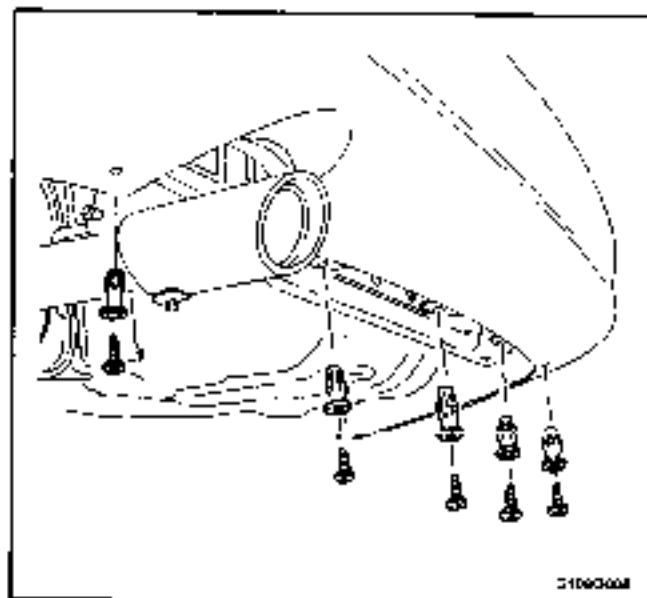


**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

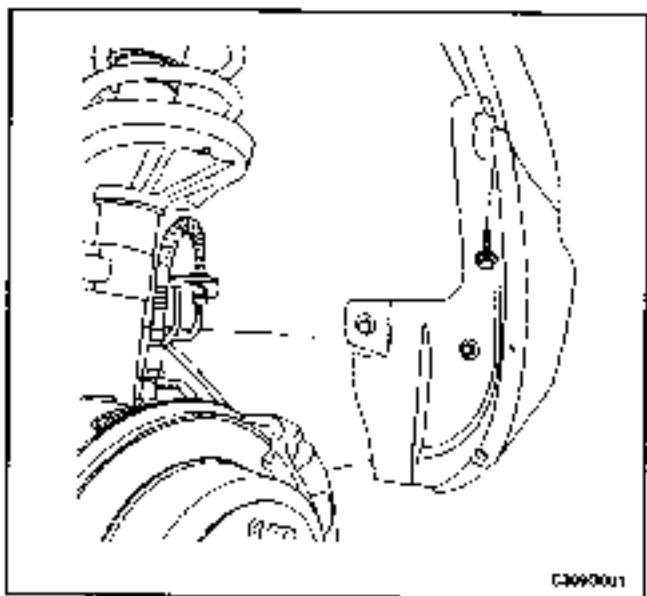
3. Install the luggage compartment fascia bolts.

**Tighten**

Tighten the luggage compartment fascia bolts to  $2 \text{ N}\cdot\text{m}$  (18 lb-in).



4. Install the luggage compartment wheelhouse trim panel. Refer to Section 9G, Interior Trim.
5. Install the lower fascia screws.



6. Install the rear wheel well fascia bolts.

**Tighten**

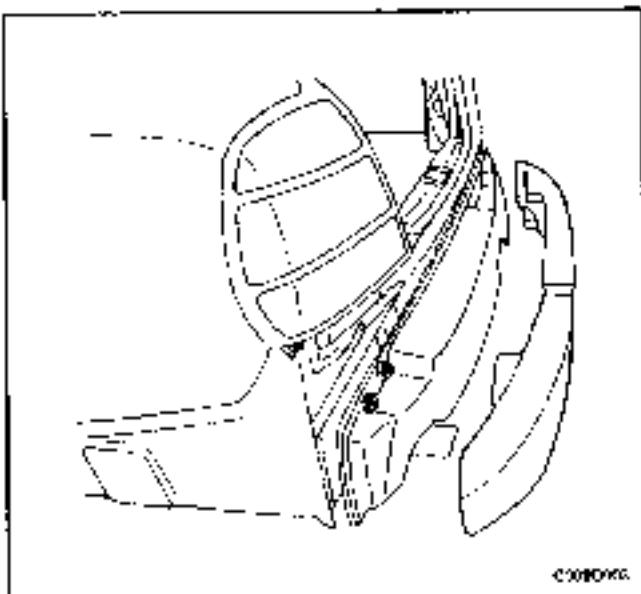
Tighten the rear wheel well fascia bolts to  $2 \text{ N}\cdot\text{m}$  (18 lb-in).

7. Install the rear wheel mud guards. Refer to Section 9M, Exterior Trim.
8. Install the rear wheels. Refer to Section 2E, Tires and Wheels.

## REAR BUMPER ENERGY ABSORBER

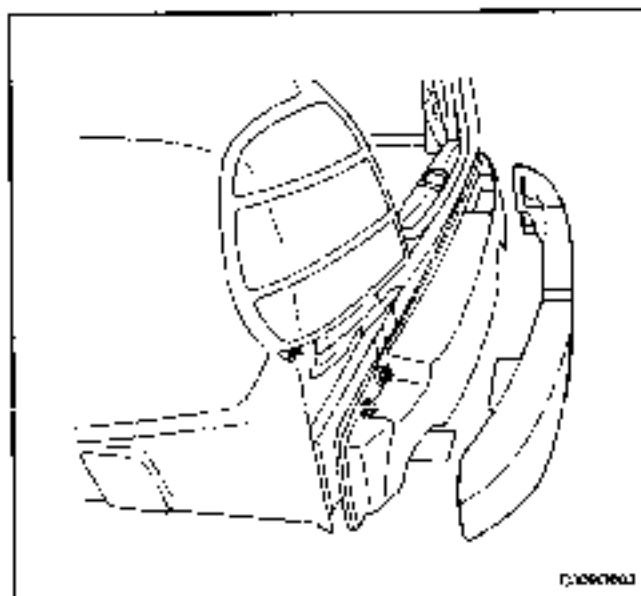
### Removal Procedure

1. Remove the rear bumper fascia. Refer to "Rear Bumper Fascia" in this section.
2. Remove the energy absorber.



### Installation Procedure

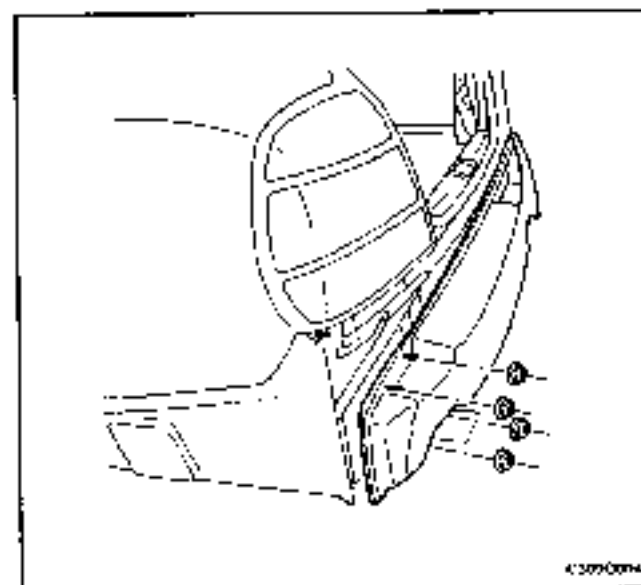
1. Install the energy absorber.
2. Install the rear bumper fascia. Refer to "Rear Bumper Fascia" in this section.

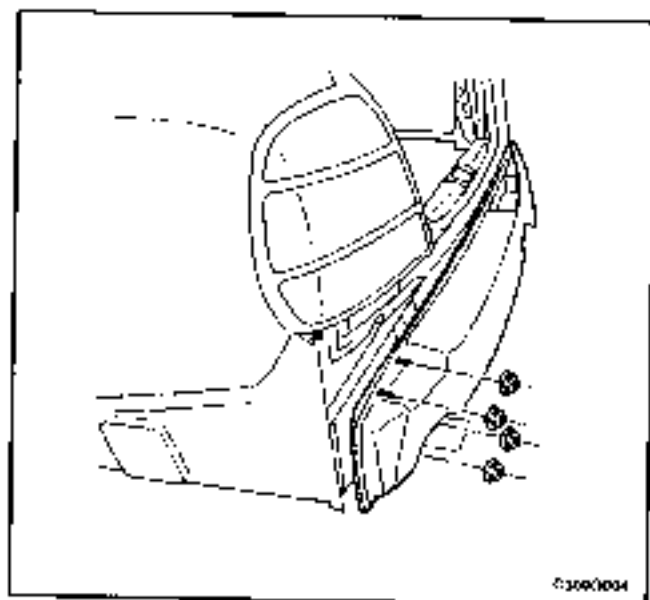


## REAR BUMPER IMPACT BAR

### Removal Procedure

1. Remove the rear bumper fascia. Refer to "Rear Bumper Fascia" in this section.
2. Remove the rear bumper energy absorber. Refer to "Rear Bumper Energy Absorber" in this section.
3. Remove the nuts and the impact bar.





### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the impact bar with the nuts.

#### Tighten

Tighten the rear impact bar nuts to 9 N•m (80 lb in).

2. Install the rear bumper energy absorber. Refer to "Rear Bumper Energy Absorber" in this section.
3. Install the rear bumper fascia. Refer to "Rear Bumper Fascia" in this section.

## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **BUMPERS**

The bumper systems are designed to sustain a collision into a fixed barrier at 8 km/h (5 mph) without damage. After absorbing the energy of a collision, these bumper systems restore themselves to their original positions. The bumpers feature an internal foam energy absorber and a polymer fascia cover.



## SECTION 9P

# DOORS

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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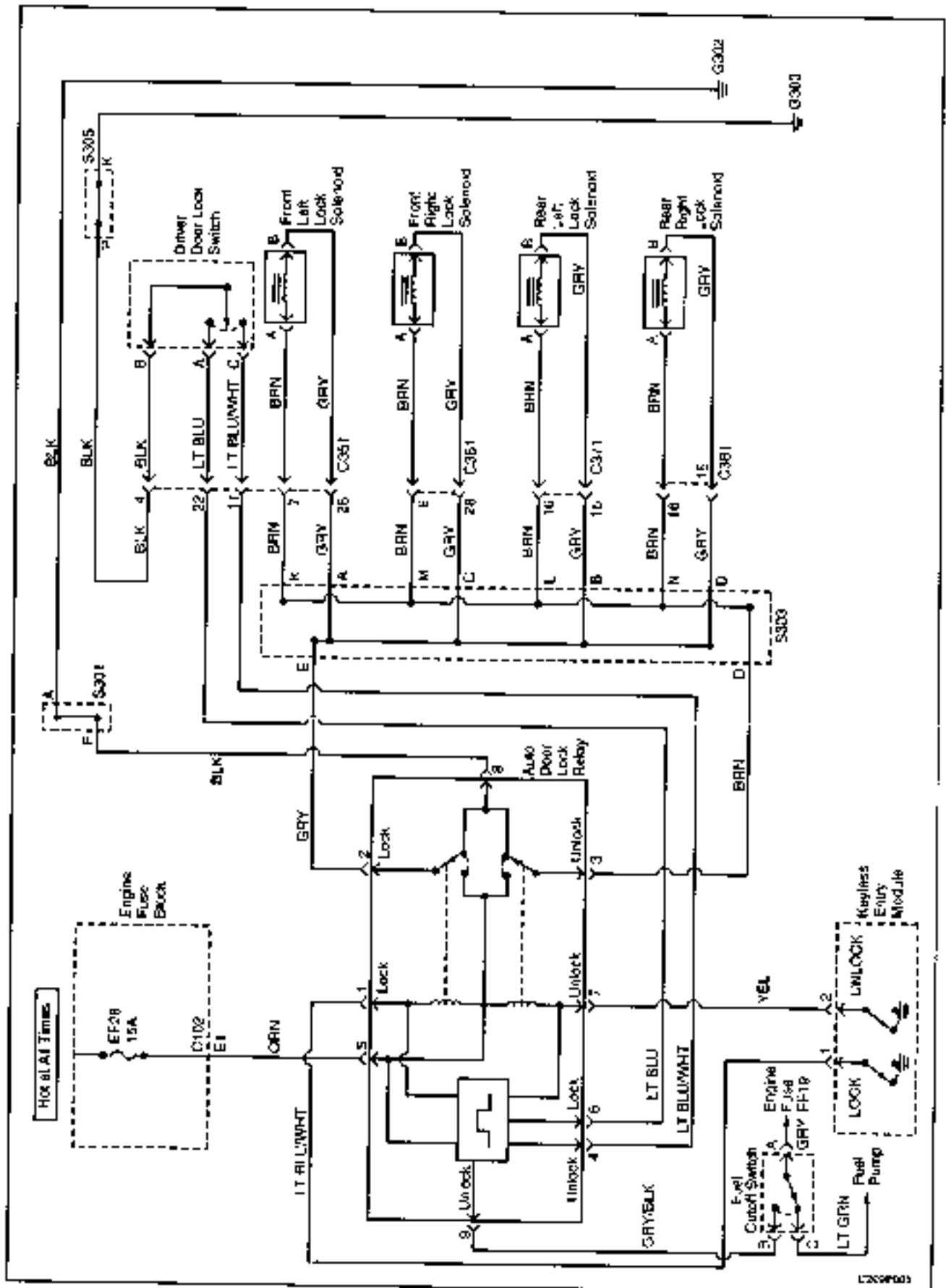
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Door Hinge-to-Body Bolts	39	29	-
Door Hinge-to-Door Bolts	20	15	-
Door Hold-Open Link-to-Body Bolt	25	18	-
Door Hold-Open Link-to-Door Bolts	7	-	62
Door Lock Striker Screws	20	15	-
Door Pull Bracket Screws	3	-	27
Front Door Lock Screws	8	-	71
inside Door Handle Screw	3	-	27
Outside Channel Molding Screw	4	-	35
Outside Door Handle Bolts	4.5	-	40
Rear Door Guide Rail Bolts	7	-	62
Rear Door Guide Rail Screw	1	-	35
Rear Door Lock Screws	8	-	71
Window Regulator Nuts	7	-	62

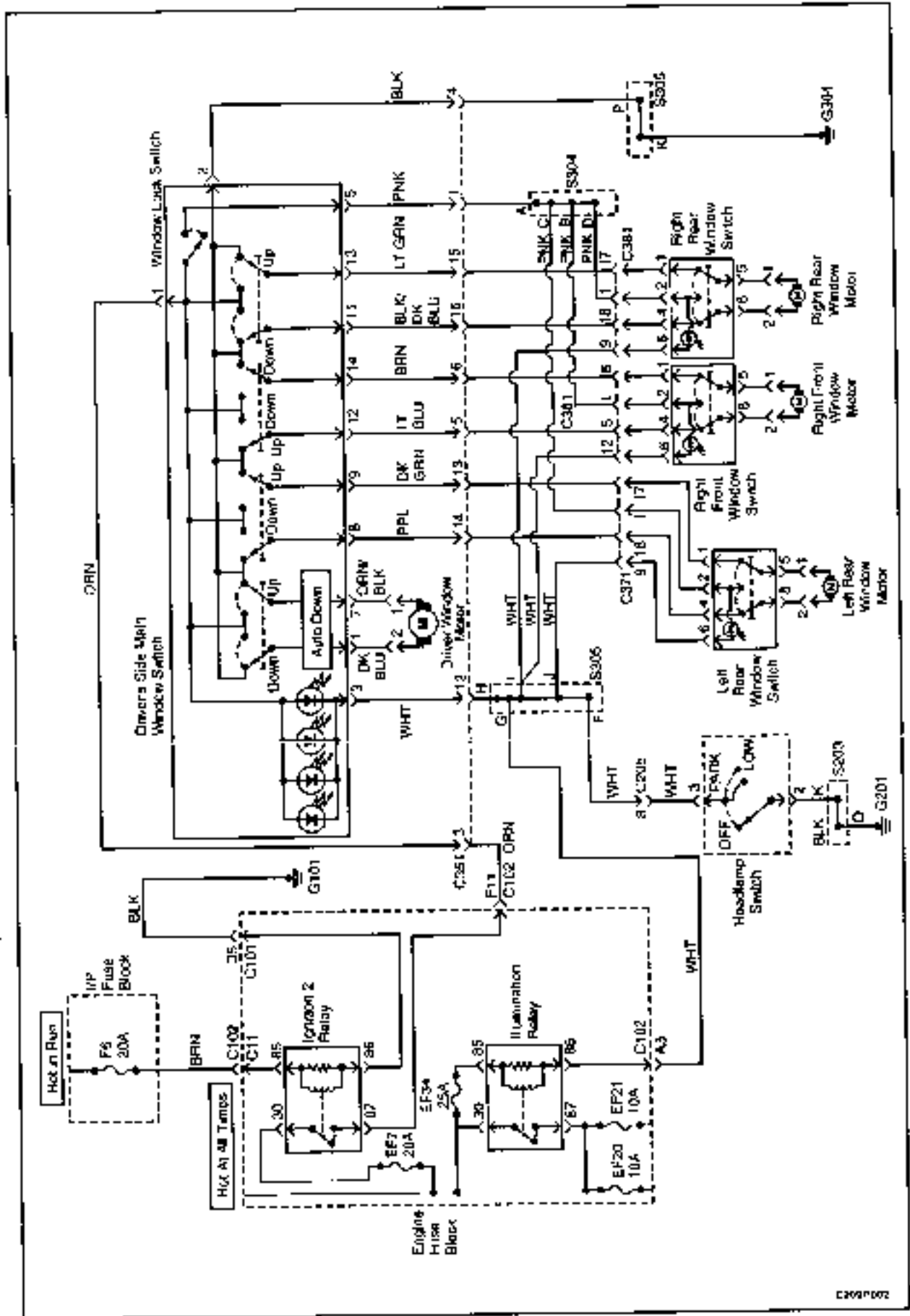
## SCHEMATIC AND ROUTING DIAGRAMS

## POWER DOOR LOCKS



LX39601

**POWER WINDOWS**  
 (Left-Hand Drive Shown, Right-Hand Drive Similar)



# DIAGNOSIS

## POWER DOOR LOCKS

### Power Door Locks Do Not Operate At Any Door

Step	Action	Value	Yes	No
1	Check fuse EF28 Is fuse EF28 blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair it, if necessary. 2. Replace fuse EF28 Is the repair complete?	-	System OK	-
3	Check the voltage at fuse EF28 Is the voltage equal to the specified value?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply circuit for fuse EF28. Is the repair complete?	-	System OK	-
5	Check the voltage at the GRY/BLK wire of the door lock relay connector. Is the voltage equal to the specified value?	0 v	Go to Step 7	Go to Step 6
6	Repair the short to voltage between the door lock relay connector and the fuel cutoff switch Is the repair complete?	-	System OK	-
7	Check the voltage at terminal 5 (ORN) of the door lock relay connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 9	Go to Step 8
8	Repair the open circuit between fuse EF28 and terminal 5 (ORN) of the door lock relay connector Is the repair complete?	-	System OK	-
9	Use an ohmmeter to check continuity between terminal 8 (BLK) of the door lock relay connector and ground Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 11	Go to Step 10
10	Repair the open circuit between terminal 8 (BLK) of the door lock relay connector and ground. Is the repair complete?	-	System OK	-
11	1. Disconnect the door lock relay connector 2. Connect a fused jumper wire to the positive battery terminal. 3. Connect another jumper wire to ground. 4. Apply the positive jumper wire to terminal 2 (GRY) of the door lock relay connector. 5. Apply the grounded jumper wire to terminal 3 (BRN) of the door lock relay connector. 6. Switch the jumper wires so that the positive jumper is connected to terminal 3 (BRN) and the grounded jumper is connected to terminal 2 (GRY).  Do the doors lock and unlock when power and ground are applied to terminals 2 and 3 of the door lock relay connector?	-	Go to Step 13	Go to Step 12
12	Repair the open circuit between the door lock relay connector and S303 Is the repair complete?	-	System OK	-

## Power Door Locks Do Not Operate At Any Door (Cont'd)

Step	Action	Value	Yes	No
13	<ol style="list-style-type: none"> <li>1. Raise the power window in the driver's door.</li> <li>2. Disconnect the door lock connector at the top of the door lock. (There are three connectors on the door lock. Use the schematic to verify the correct connector.)</li> <li>3. Use an ohmmeter to check continuity between terminal B (BLK) of the door lock switch connector and ground.</li> </ol> Does the ohmmeter indicate the specified value?	- 0 Ω	Go to Step 15	Go to Step 14
14	Repair the open circuit between the door lock switch connector terminal B (BLK) and ground. Is the repair complete?	-	System OK	-
15	<ol style="list-style-type: none"> <li>1. Make sure that the door lock relay connector is connected.</li> <li>2. Touch a grounded jumper wire to terminal A (LT BLU) of the disconnected door lock switch connector.</li> <li>3. Remove the grounded jumper wire and touch it to terminal C (LT BLU/WHT) of the disconnected door lock switch connector.</li> </ol> Do the doors lock and unlock when terminals C and A are alternately grounded?	-	Go to Step 16	Go to Step 17
16	<ol style="list-style-type: none"> <li>1. Make sure all the lock rods are connected to the driver's door lock.</li> <li>2. If no disconnected lock rods are found, replace the driver's door lock with the integral door lock switch. (Do not confuse the door lock with the lock cylinder. The door lock has three connectors: the lock switch, the lock solenoid, and the door contact switch. Use the schematic to verify the correct connector.)</li> </ol> Is the repair complete?	-	System OK	-
17	Use an ohmmeter to check the continuity between terminal A (LT BLU) of the disconnected door lock switch connector and terminal 6 (LT BLU) of the door lock relay connector. Does the ohmmeter indicate the specified value?	- 0 Ω	Go to Step 19	Go to Step 18
18	Repair the open LT BLU wire. Is the repair complete?	-	System OK	-
19	Use an ohmmeter to check the continuity between terminal C (LT BLU/WHT) of the disconnected door lock switch connector and terminal 4 (LT BLU/WHT) of the door lock relay connector. Does the ohmmeter indicate the specified value?	- 0 Ω	Go to Step 21	Go to Step 20
20	Repair the open LT BLU/WHT wire. Is the repair complete?	-	System OK	-
21	Replace the door lock relay. Is the repair complete?	-	System OK	-

## POWER WINDOWS

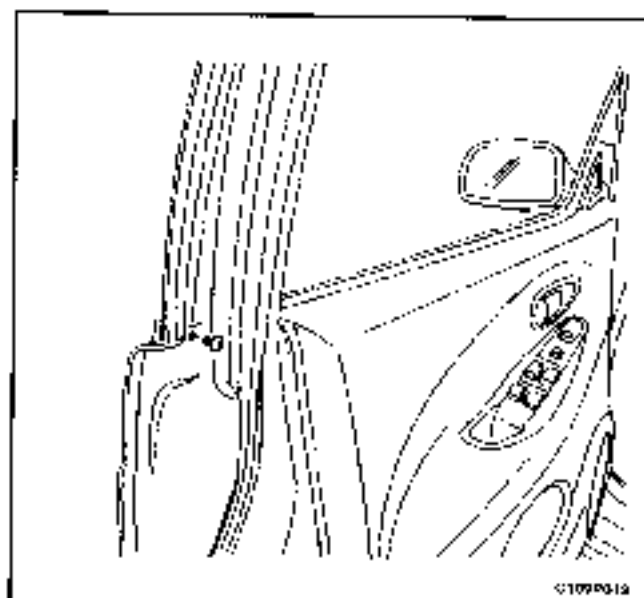
## Power Windows Do Not Operate

Step	Action	Value	Yes	No
1	1. Make sure the window lock switch on the driver's door is not engaged. 2. Test each of the power windows. Does any power window operate?	-	Go to Step 7	Go to Step 2
2	1. At the driver's door, remove the power window/power mirror switch retaining screw. 2. Lift up the power window switch so that the connector is exposed. 3. Turn the ignition ON. 4. Check the voltage at terminal 10 (ORN) of the power window switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 4	Go to Step 3
3	Repair the open power supply circuit to the driver's door power window switch. Is the repair complete?	-	System OK	-
4	Use an ohmmeter to check continuity between ground and terminal 4 (BLK) of the driver's door power window switch connector. Does the ohmmeter indicate the specified value?	$\infty \Omega$	Go to Step 6	Go to Step 5
5	Repair the open circuit between ground and terminal 4 (BLK) of the driver's door power window switch. Is the repair complete?	-	System OK	-
6	Replace the driver's door power window switch. Is the repair complete?	-	System OK	-
7	1. At the door with the inoperative power window, remove the door trim panel. 2. Connect a fused jumper wire to the positive battery terminal. 3. Connect another jumper wire to the negative battery terminal. 4. Disconnect the two-wire connector that connects the window motor to the door harness. 5. Connect the negative jumper wire to one of the terminals of the two-wire connector. 6. Touch the positive jumper wire to the other terminal of the two-wire connector. 7. Reverse the jumper wire connections. Does the window move up when the motor is powered directly by the battery, and down when the jumper connections are reversed?	-	Go to Step 9	Go to Step 8
8	Replace the window motor. Is the repair complete?	-	System OK	-
9	Check the operation of the windows. Is the driver's window the one that is inoperative?	-	Go to Step 10	Go to Step 11
10	Replace the driver's door power window switch. Is the repair complete?	-	System OK	-

## Power Windows Do Not Operate (Cont'd)

Step	Action	Value	Yes	No
11	1. Make sure the window lock switch on the driver's door is not engaged. 2. Turn the ignition ON. 3. Backprobe to check the voltage at terminal 5 (PNK) of the driver's door power window switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 12	Go to Step 10
12	1. Make sure the window lock switch on the driver's door is not engaged. 2. Turn the ignition ON. 3. Check the voltage at terminal 5 (PNK) of the window switch connector for the inoperative window. Is the voltage equal to the specified value?	11-14 v	Go to Step 14	Go to Step 13
13	Repair the open (PNK) wire between the window switch and the driver's door power window switch. Is the repair complete?	-	System OK	-
14	1. At the inoperative window switch, use an ohmmeter to check continuity between ground and terminal 1. 2. At the inoperative window switch, use an ohmmeter to check continuity between ground and terminal 4. When performing both ohmmeter tests, does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 15	Go to Step 16
15	Replace the power window switch. Is the repair complete?	-	System OK	-
16	If one of the window switch wires tested in Step 15 does not show continuity with ground, use an ohmmeter to test the continuity of that wire between the window switch and the driver's door power window switch. Does the ohmmeter indicate the specified value?	$\approx 0 \Omega$	Go to Step 17	Go to Step 18
17	Replace the window switch for the inoperative window. Is the repair complete?	-	System OK	-
18	Repair the open circuit between the window switch and the driver's door power window switch. Is the repair complete?	-	System OK	-





## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### OUTSIDE CHANNEL MOLDING

(Left-Hand Drive Shown, Right-Hand Drive Similar)

##### Removal Procedure

1. Lower the window completely.
2. Remove the outside channel molding screw. (Front door shown, rear door similar.)
3. Remove the outside rearview mirror. Refer to Section 9L, Glass and Mirrors.
4. Lift the outside channel molding off the door.

##### Installation Procedure

1. Press the outside channel molding onto the door.

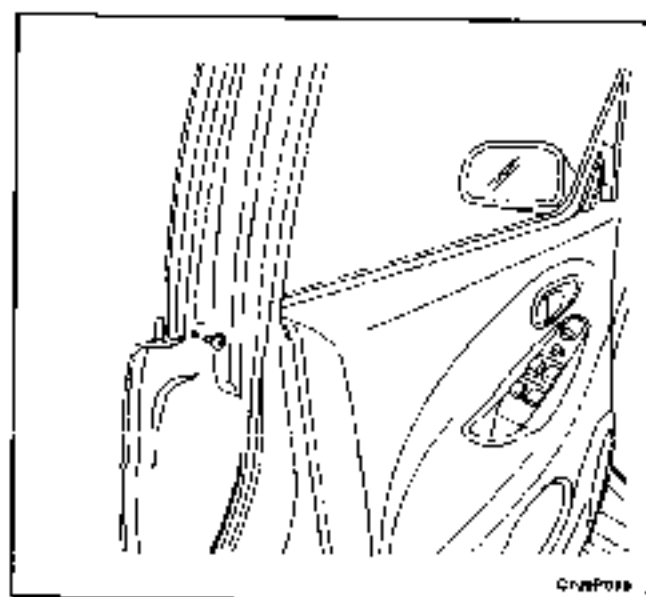
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the outside channel molding screw. (Front door shown, rear door similar.)

##### Tighten

Tighten the outside channel molding screw to 4 N•m (35 lb-in).

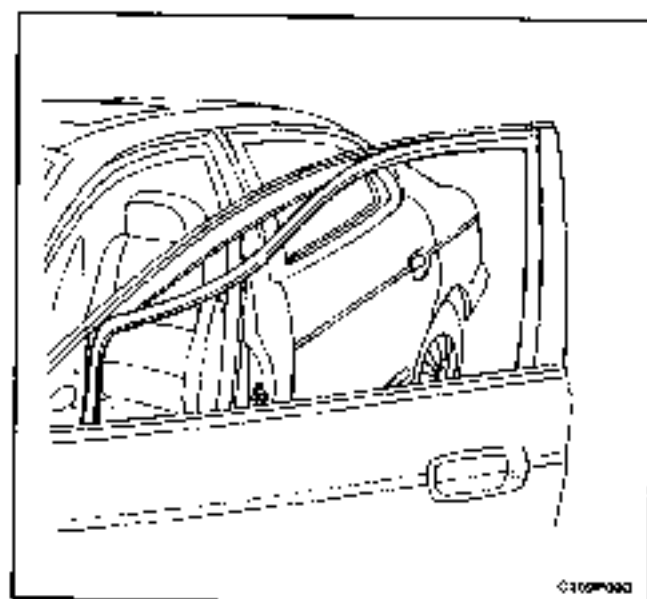
3. Install the outside rearview mirror. Refer to Section 9L, Glass and Mirrors.
4. Raise the window.

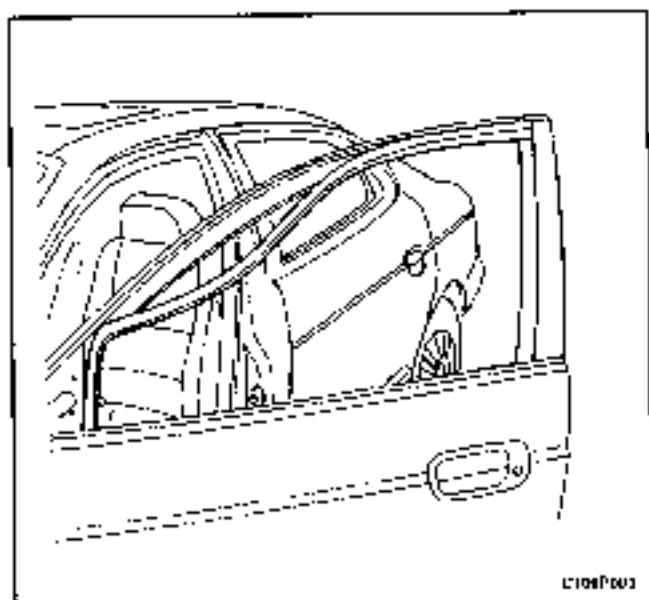


#### FRONT DOOR GLASS RUN

##### Removal Procedure

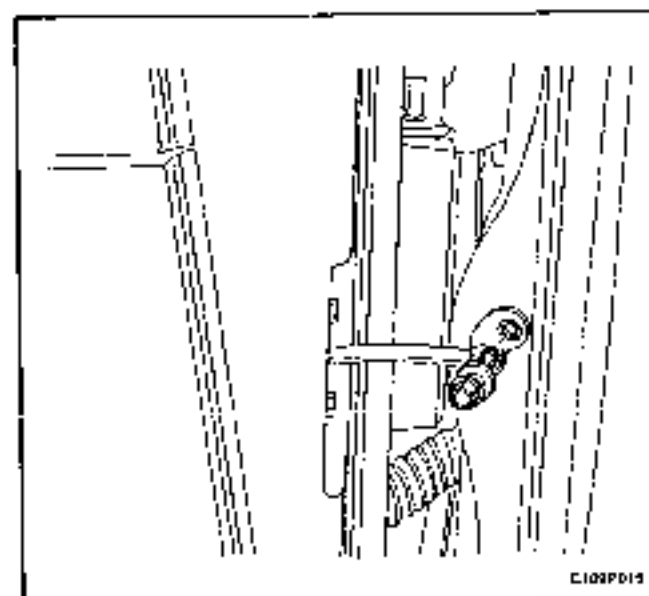
1. Remove the outside rearview mirror. Refer to Section 9L, Glass and Mirrors.
2. Remove the front door glass. Refer to Section 9L, Glass and Mirrors.
3. Remove the glass run.





### Installation Procedure

1. Install the glass run.
2. Install the front door glass. Refer to Section 9L, *Glass and Mirrors*.
3. Install the outside rearview mirror. Refer to Section 5L, *Glass and Mirrors*.

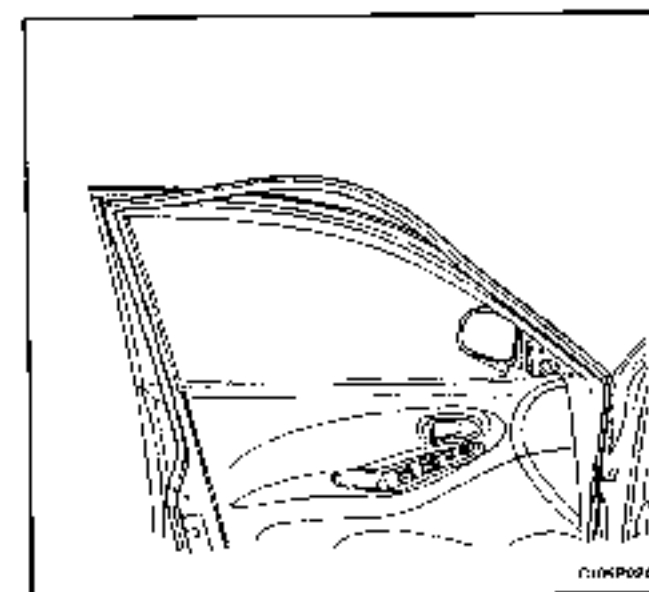


### DOOR WEATHERSTRIP

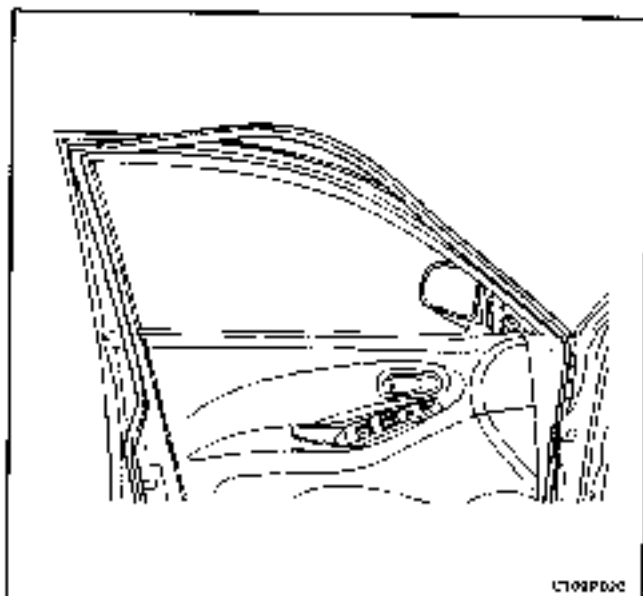
(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

1. Remove the door hold-open link-to-body bolt and the door hold-open link. (Front door shown, rear door similar.)

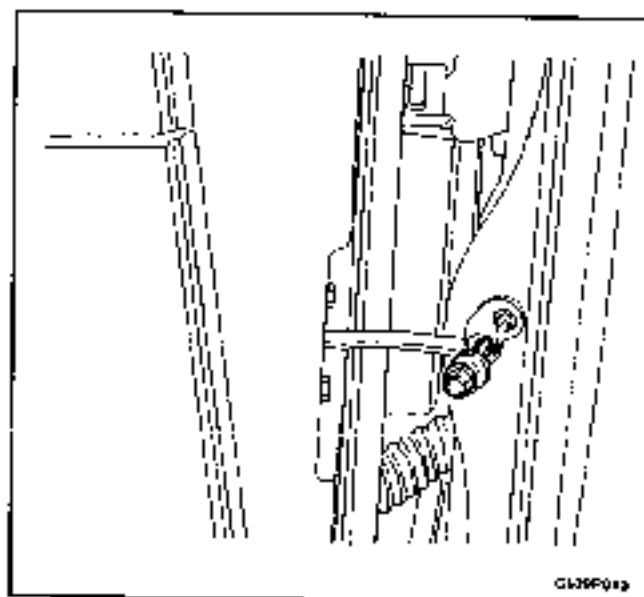


2. Remove the door weatherstrip. (Front door shown, rear door similar.)



### Installation Procedure

1. Install the door weatherstrip. (Front door shown, rear door similar.)

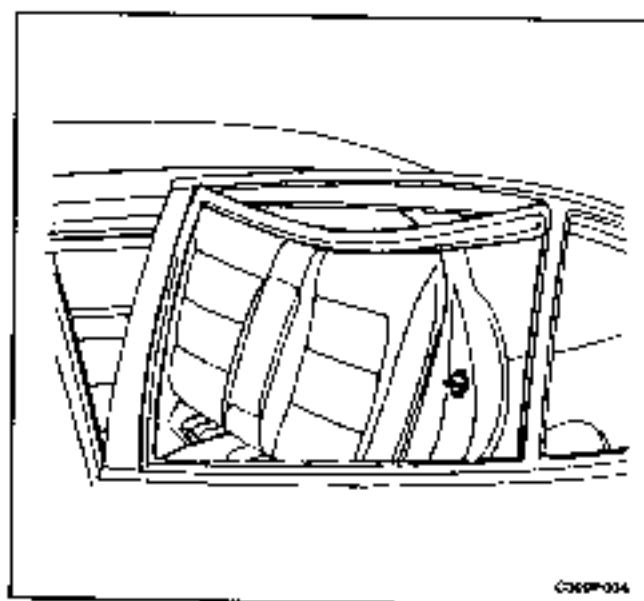


**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the door hold-open link to the body with the bolt. (Front door shown, rear door similar.)

### Tighten

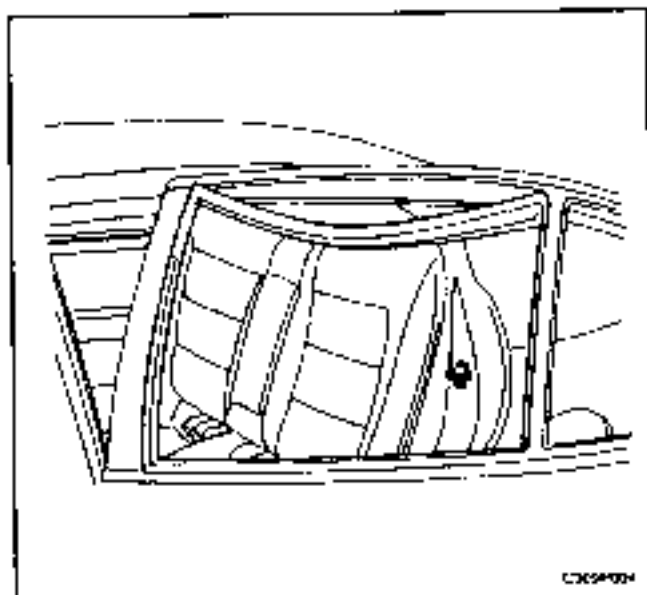
Tighten the door hold-open link-to-body bolt to 25 N•m (18 lb-ft).



## REAR DOOR GLASS RUN

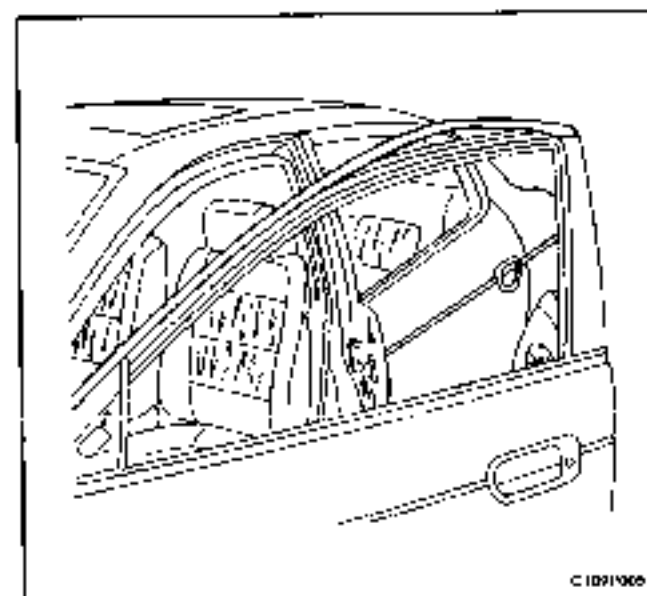
### Removal Procedure

1. Remove the rear door glass. Refer to *Section 9L, Glass and Mirrors*.
2. Remove the rear door glass run.



### Installation Procedure

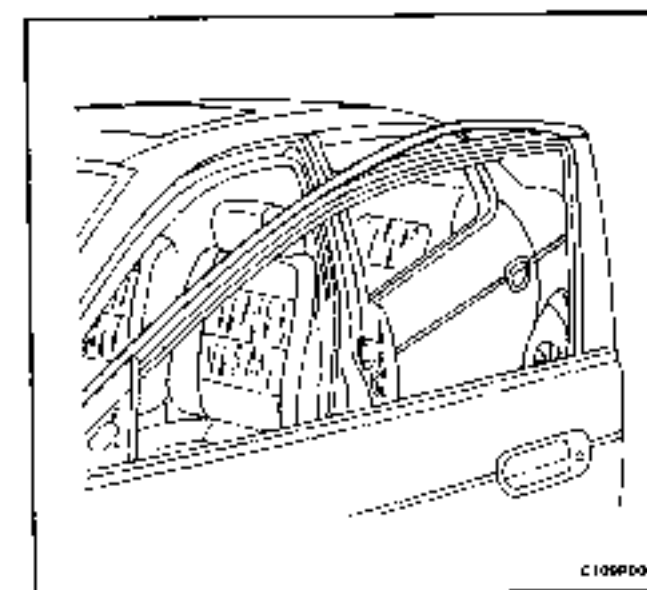
1. Install the rear door glass run.
2. Install the rear door glass. Refer to *Section 9L, Glass and Mirrors*.



### FRONT DOOR SECONDARY WEATHERSTRIP

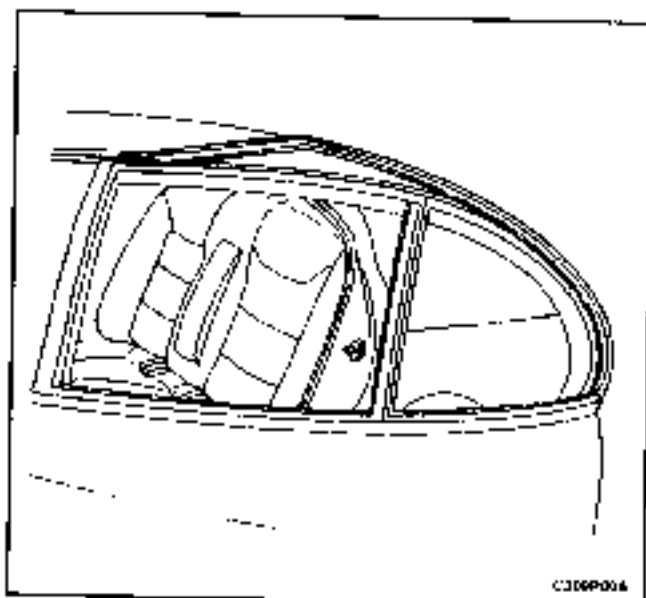
#### Removal Procedure

1. Remove the outside rearview mirror. Refer to *Section 9L, Glass and Mirrors*.
2. Remove the front door secondary weatherstrip.



#### Installation Procedure

1. Install the front door secondary weatherstrip.
2. Install the outside rearview mirror. Refer to *Section 9L, Glass and Mirrors*.

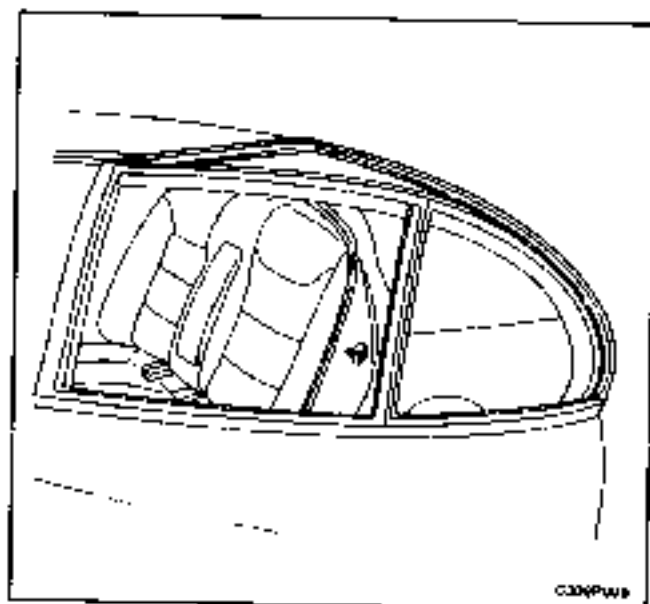


C306P004

## REAR DOOR SECONDARY WEATHERSTRIP

### Removal Procedure

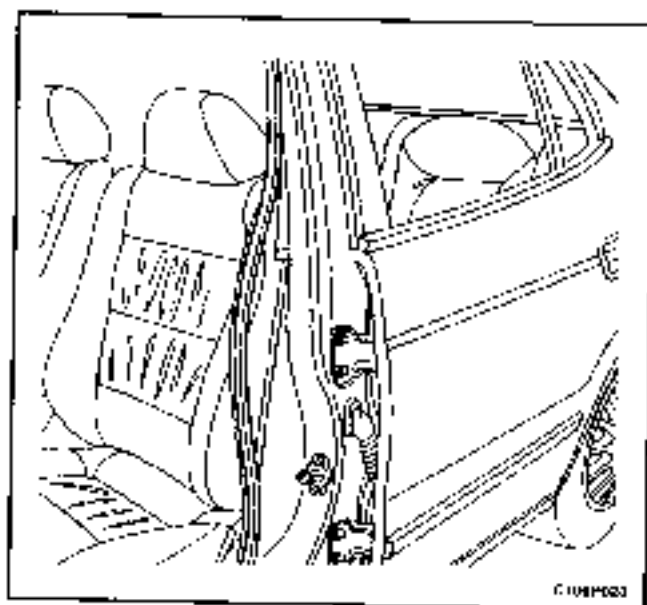
1. Remove the rear door secondary weatherstrip.



C306P005

### Installation Procedure

1. Install the rear door secondary weatherstrip.

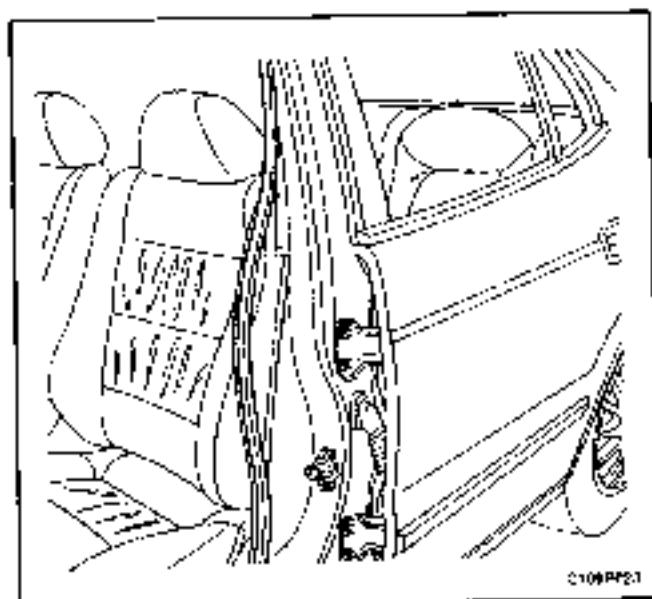


C108P003

## FRONT DOOR OPENING WEATHERSTRIP

### Removal Procedure

1. Remove the kick panel, the front rocker panel, and the lower B-pillar trim panel. Refer to Section 9G, Interior Trim.
2. Remove the front door opening weatherstrip.



C106RP21

### Installation Procedure

1. Install the front door opening weatherstrip.
2. Install the kick panel, the front rocker panel, and the lower B-pillar trim panel. Refer to Section 9G, *Interior Trim*.

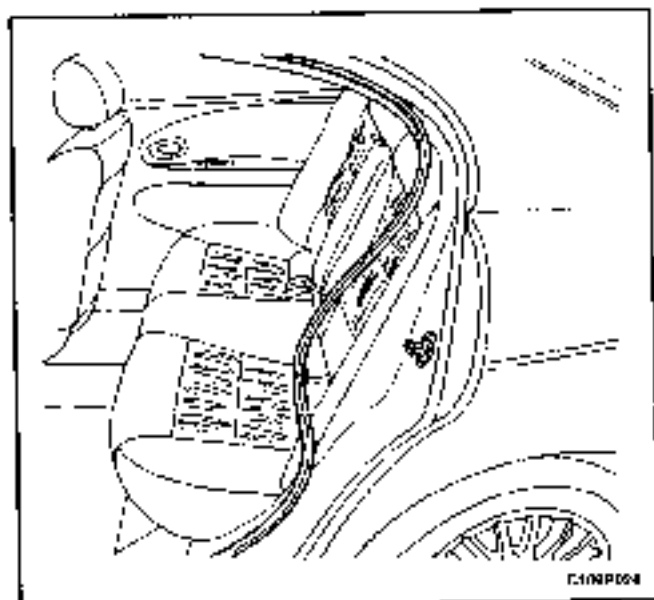
### REAR DOOR OPENING WEATHERSTRIP

#### Removal Procedure

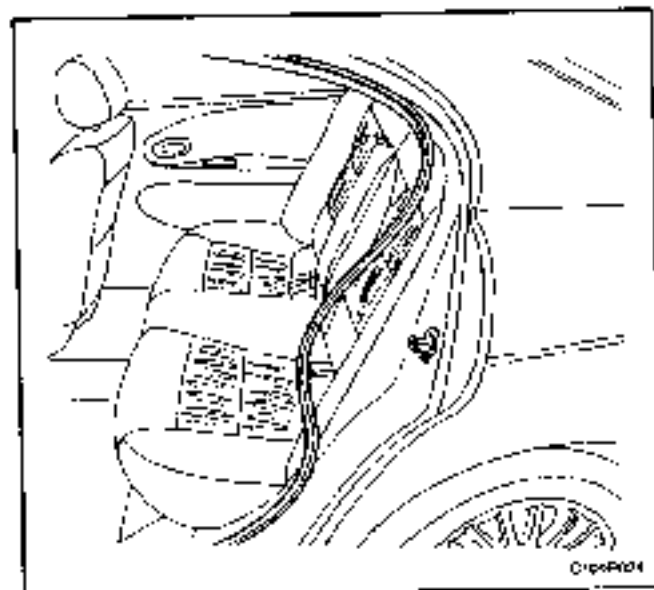
1. Remove the rear rocker panel and the lower B-pillar trim panel. Refer to Section 9G, *Interior Trim*.
2. Remove the rear door opening weatherstrip.

#### Installation Procedure

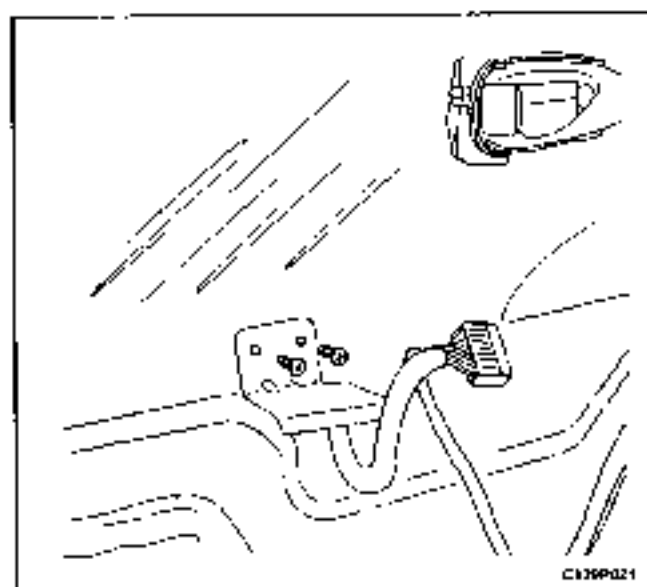
1. Install the rear door opening weatherstrip.
2. Install the rear rocker panel and the lower B-pillar trim panel. Refer to Section 9G, *Interior Trim*.



C106RP24



C106RP24

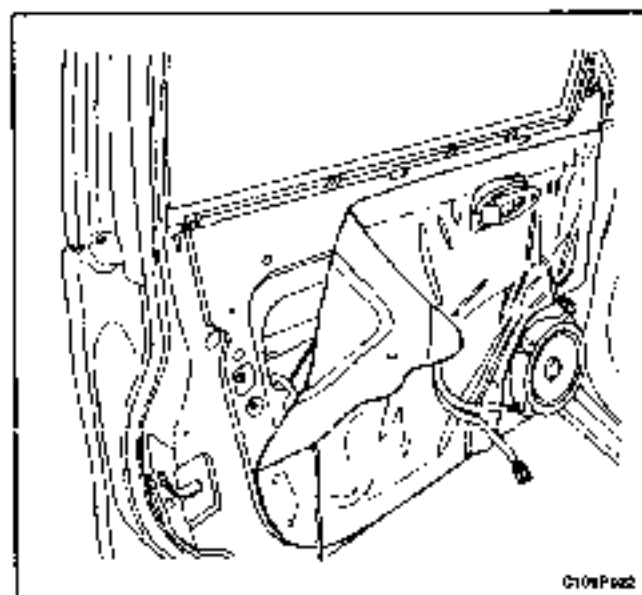


C139P021

## DOOR SEAL TRIM

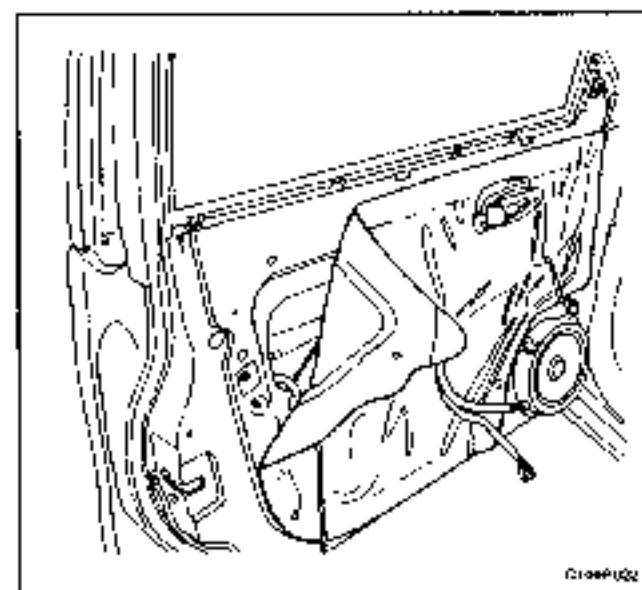
### Removal Procedure

1. Remove the door trim panel. Refer to Section 9G, Interior Trim.
2. Remove the screws and the door pull bracket. (Front door shown, rear door similar.)



C109P022

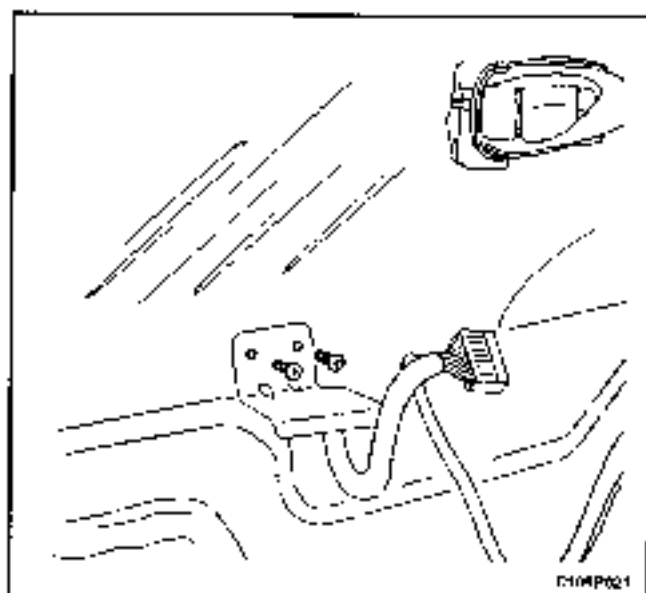
3. Remove the door seal trim. (Front door shown, rear door similar.)



C109P022

### Installation Procedure

1. Install the door seal trim. (Front door shown, rear door similar.)



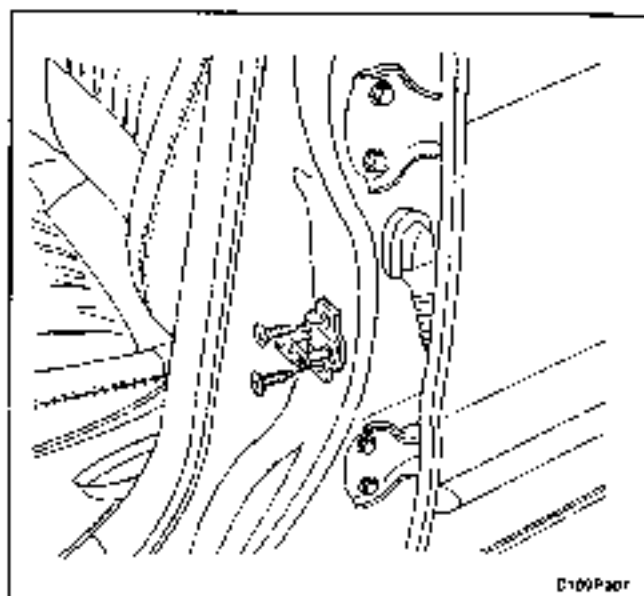
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the door pull bracket with the screws. (Front door shown, rear door similar.)

#### Tighten

Tighten the door pull bracket screws to 3 N•m (27 lb-in).

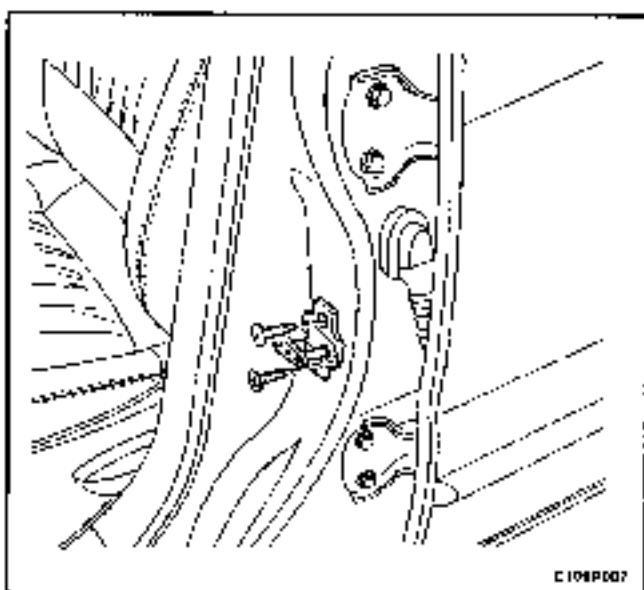
3. Install the door trim panel. Refer to Section 9G, *Interior Trim*.



## DOOR LOCK STRIKER

### Removal Procedure

1. Remove the screws and the door lock striker. (Front door shown, rear door similar.)



### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the screws and the door lock striker. (Front door shown, rear door similar.)

#### Tighten

Tighten the door lock striker screws to 20 N•m (15 lb-ft).

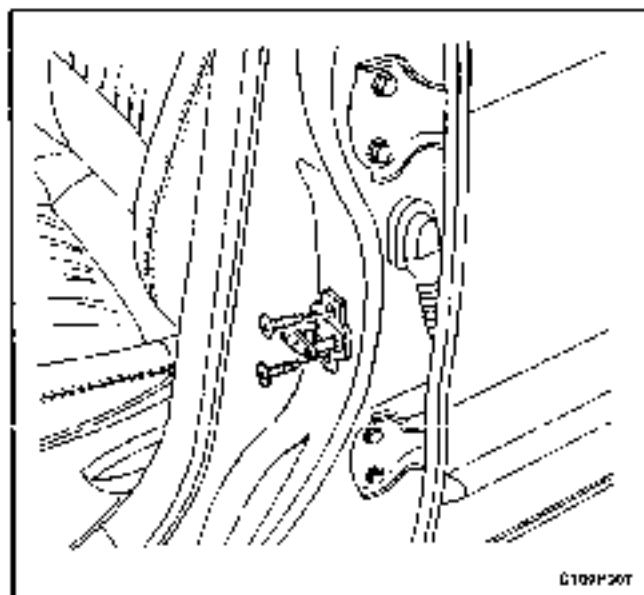


## DOOR LOCK STRIKER ADJUSTMENT

The door lock striker consists of a striker with two screws that are threaded into a lapped, floating cage plate located in the appropriate body pillar. This floating cage plate allows the striker to be easily adjusted in and out or up and down.

The door is secured in the closed position when the door lock fork snaps over and engages the striker.

**Notice:** The door lock striker is an important attaching part that can affect the performance of vital components and systems. It can cause major repair expenses. If replacement becomes necessary, the door lock striker must be replaced by one with the same part number or with an equivalent. Do not use a replacement part of lesser quality or of a substitute design. The specified torque values must be used during reassembly in order to ensure the proper retention of the part.



### Up/Down or In/Out Adjustment

An adjustment of the striker in the up and down or in and out directions may be necessary for a number of reasons:

- Vehicle frame damage as the result of a collision
- Installation of new door weatherstripping.
- Customer complaints of excessive windnoise.
- Difficulty in opening or closing the door

In order to adjust the door striker in an up and down or in and out direction, perform the following procedure.

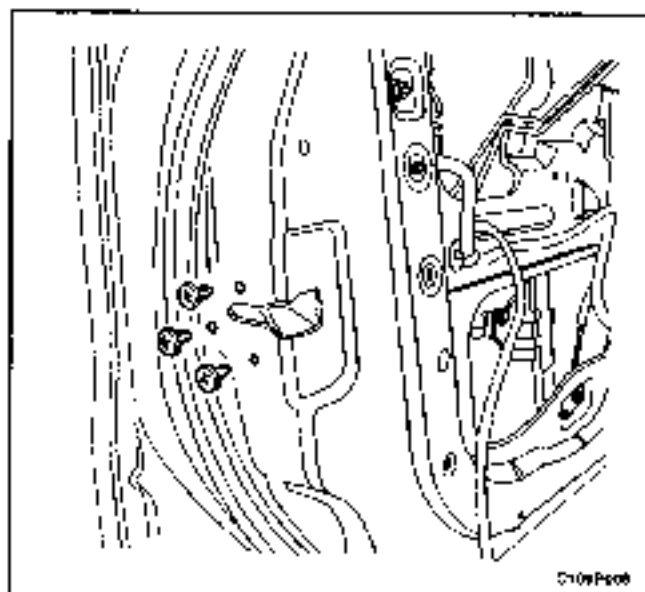
1. The door must be properly aligned.
2. Loosen the striker screws. (Front door shown, rear door similar.)
3. The floating cage plate can be moved slightly using the ends of the striker screws. Move the floating cage plate to the desired position.

**Notice:** It is important to use a flat-end rotary file in order not to damage the tapered floating cage plate. The striker screws and the tapered floating cage plate are important attaching parts that could affect the performance of vital components and systems.

4. If proper adjustment requires that the floating cage plate be moved more than is possible, use an electric hand drill and a 3/8-inch rotary file with a flat head in order to enlarge the body opening in the direction required.
5. Tighten the striker screws to the correct position.

### Tighten

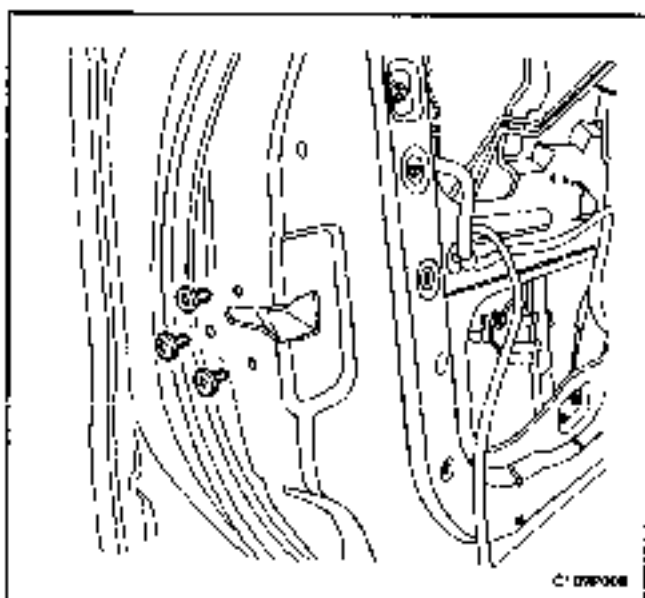
Tighten the door lock striker screws to 20 N•m (15 lb•ft)



## FRONT DOOR LOCK

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the seal trim. Refer to "Door Seal Trim" in this section.
3. Remove the screws and the front door lock.
4. Disconnect the lock rods
5. Disconnect the electrical connector.



### Installation Procedure

1. Connect the electrical connector.
2. Connect the lock rods

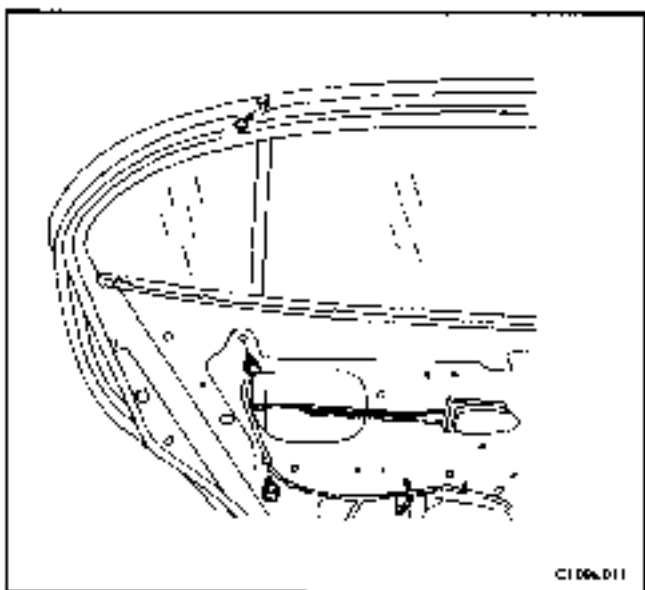
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

3. Install the front door lock with the screws.

### Tighten

Tighten the front door lock screws to 8 N·m (71 lb·in).

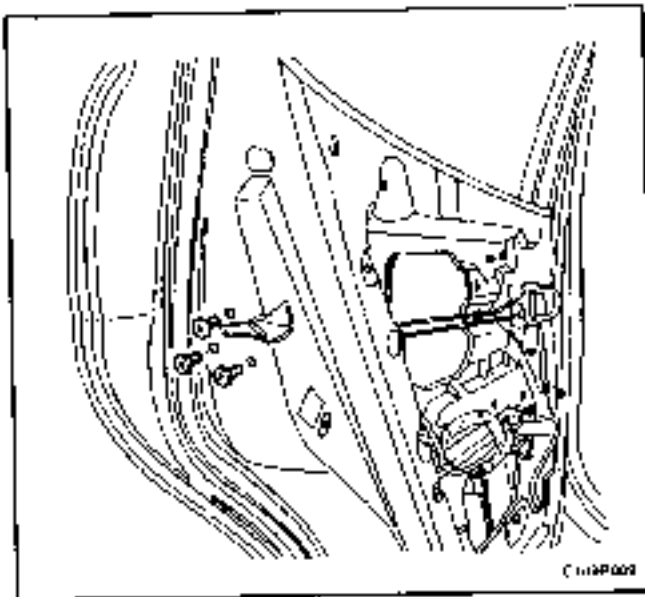
4. Install the seal trim. Refer to "Door Seal Trim" in this section.
5. Connect the negative battery cable.



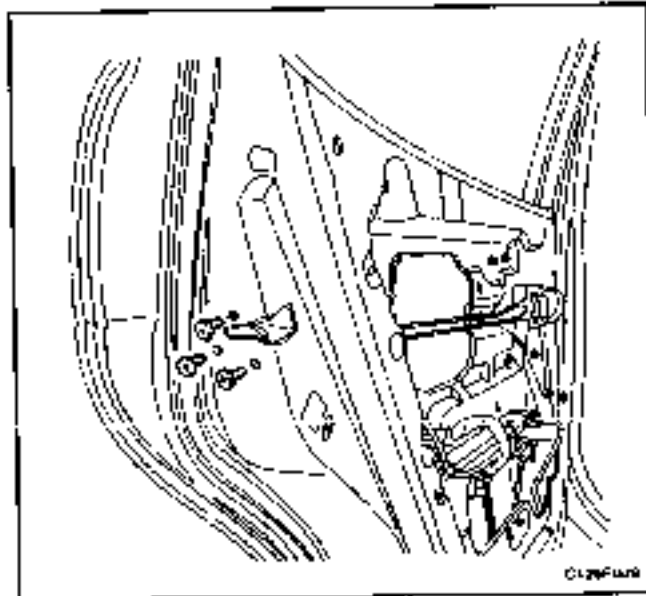
## CHILDPROOF REAR DOOR LOCK

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the door seal trim. Refer to "Door Seal Trim" in this section
3. Remove the screw and the guide rail



4. Remove the door lock screws.
5. Disconnect the lock rods.
6. Remove the door lock.
7. Disconnect the electrical connector.



### Installation Procedure

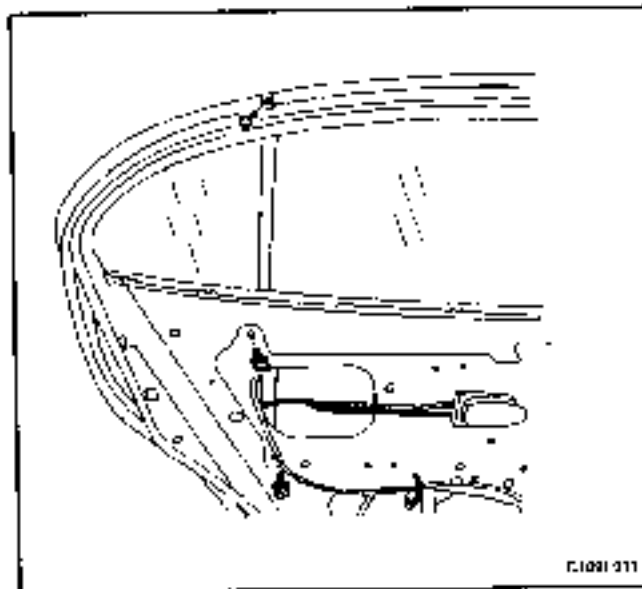
1. Connect the electrical connector.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the rear door track with the screws.

#### Tighten

Tighten the rear door lock screws to 8 N•m (71 lb-in).



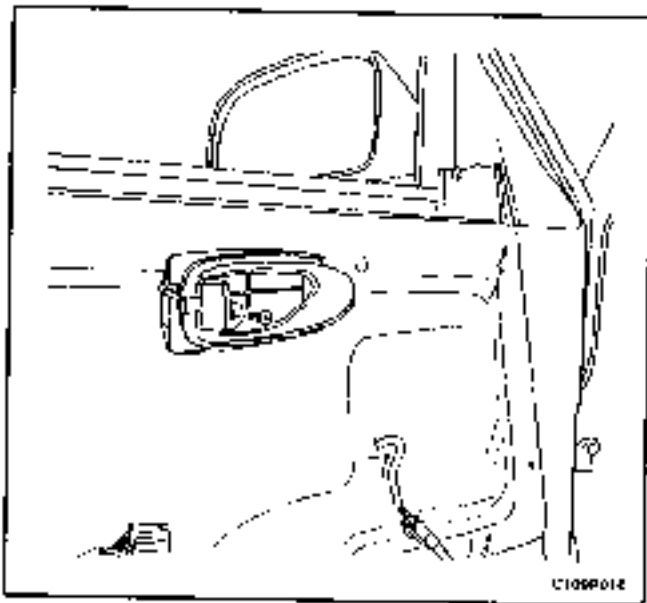
3. Install the lock rods.
4. Install the guide rail with the bolts and the screw.

#### Tighten

Tighten the rear door guide rail screw to 4 N•m (35 lb-in).

Tighten the rear door guide rail bolts to 7 N•m (62 lb-in).

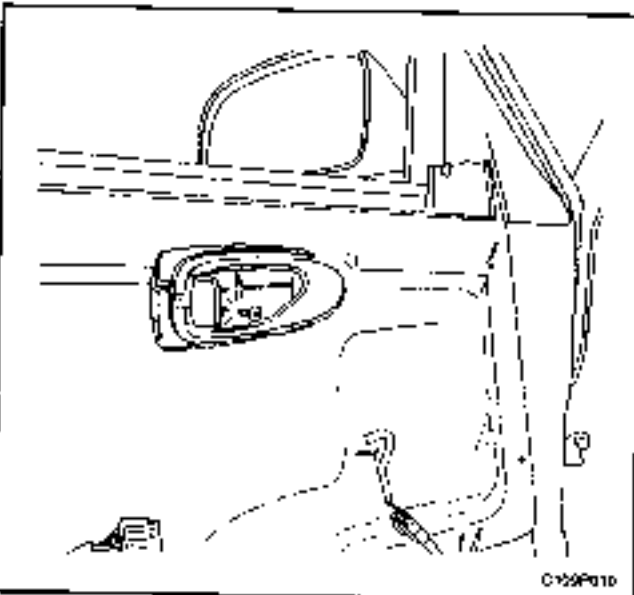
5. Install the door seal trim. Refer to "Door Seal Trim" in this section.
6. Connect the negative battery cable.



## INSIDE DOOR HANDLE

### Removal Procedure

1. Remove the door trim. Refer to Section 9G, *Interior Trim*.
2. Remove the screw that secures the door handle to the door.
3. Slide the door handle rearward and remove it from the door. (Front door shown, rear door similar.)
4. Disconnect the inside door handle and the lock rods.



### Installation Procedure

1. Connect the inside door handle and the lock rods.
2. Insert the inside door handle into the slots in the door. (Front door shown, rear door similar.)
3. Slide the door handle forward.

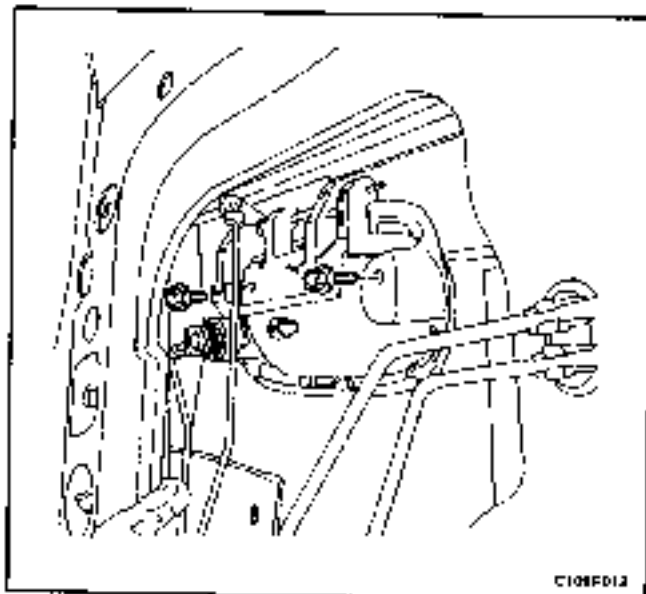
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

4. Install the inside door handle screw.

### Tighten

Tighten the inside door handle screw to 3 N·m (27 lb·in).

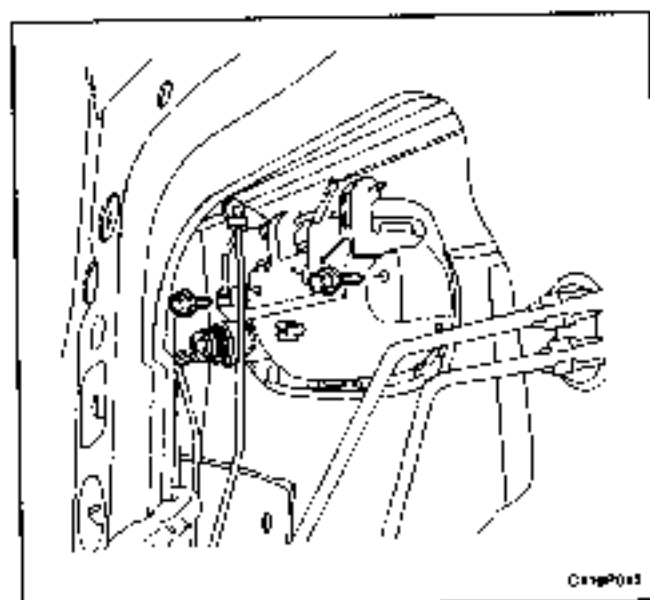
5. Install the door seal trim. Refer to Section 9G, *Interior Trim*.



## OUTSIDE DOOR HANDLE

### Removal Procedure

1. Remove the door seal trim. Refer to "Door Seal Trim" in this section.
2. Disconnect the outside door handle and the lock rods.
3. Remove the bolts and the door handle. (Front door shown, rear door similar.)



### Installation Procedure

1. Connect the outside door handle and the lock rods (Front door shown, rear door similar.)

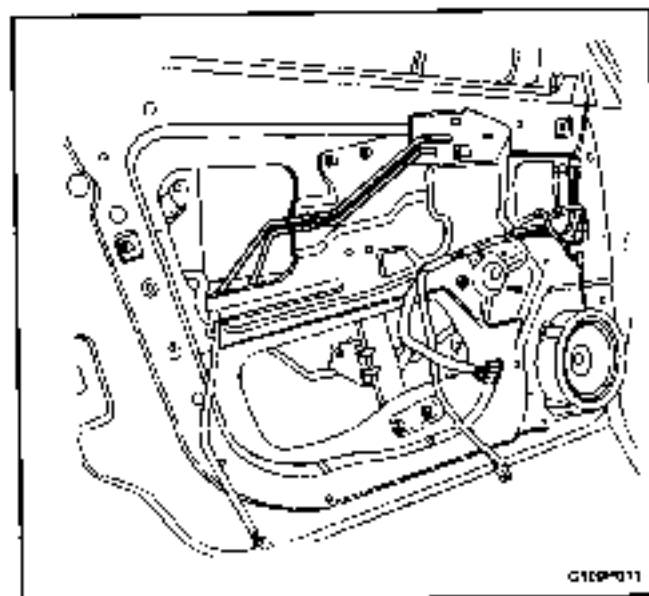
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the door handle with the bolts.

### Tighten

Tighten the outside door handle bolts to 4.5 N·m (40 lb-in).

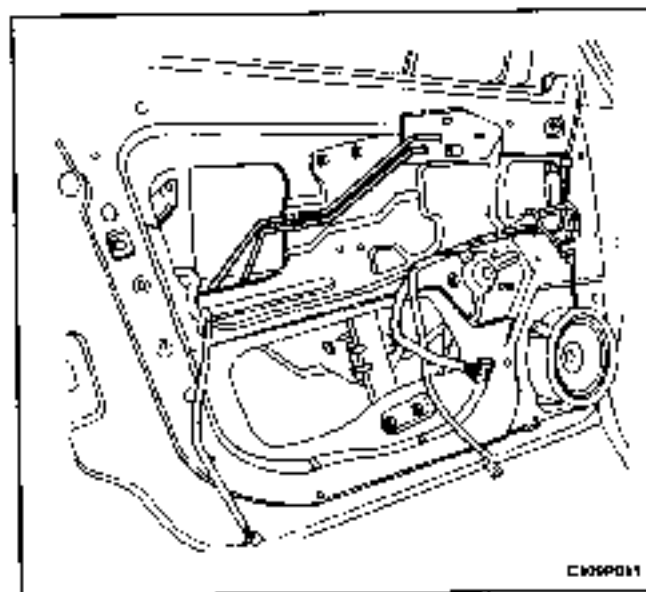
3. Install the door seal trim. Refer to "Door Seal Trim" in this section.



### INSIDE LOCK ROD

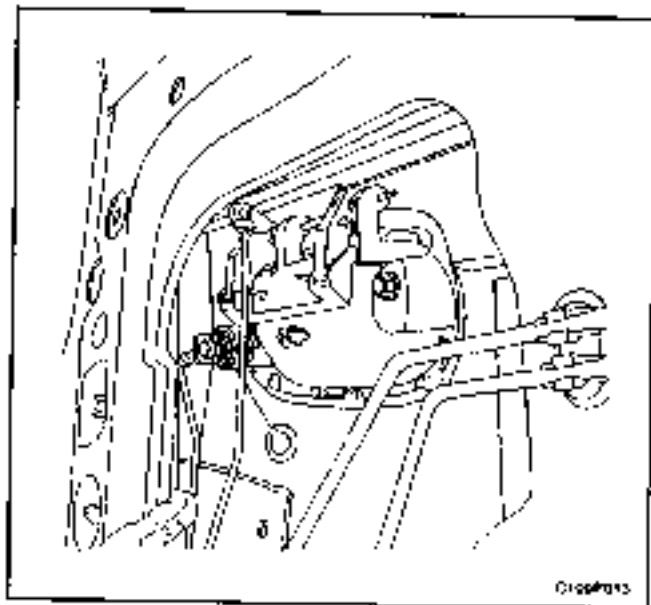
#### Removal Procedure

1. Remove the door seal trim. Refer to "Door Seal Trim" in this section.
2. Remove the inside door handle. Refer to "Inside Door Handle" in this section.
3. Disconnect the inside lock rods from the lock. (Front door shown, rear door similar.)



#### Installation Procedure

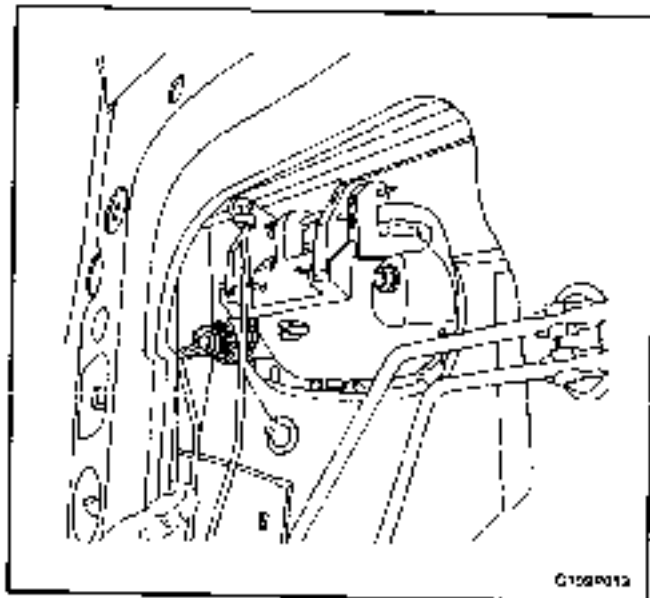
1. Connect the inside lock rods to the lock. (Front door shown, rear door similar.)
2. Install the inside door handle. Refer to "Inside Door Handle" in this section.
3. Install the door seal trim. Refer to "Door Inside Trim" in this section.



## DOOR LOCK CYLINDER

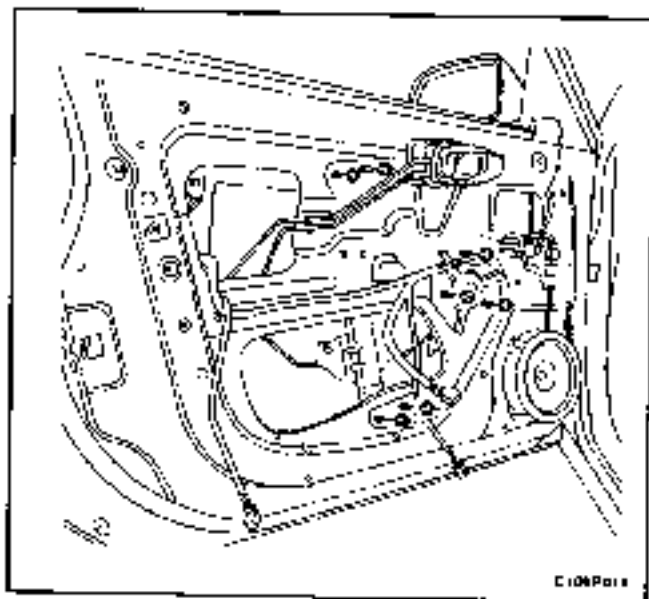
### Removal Procedure

1. Remove the door seal trim. Refer to "Door Seal Trim" in this section.
2. Disconnect the outside door handle lock rod.
3. Remove the retaining clip and the lock cylinder. (Front door shown, rear door similar.)



### Installation Procedure

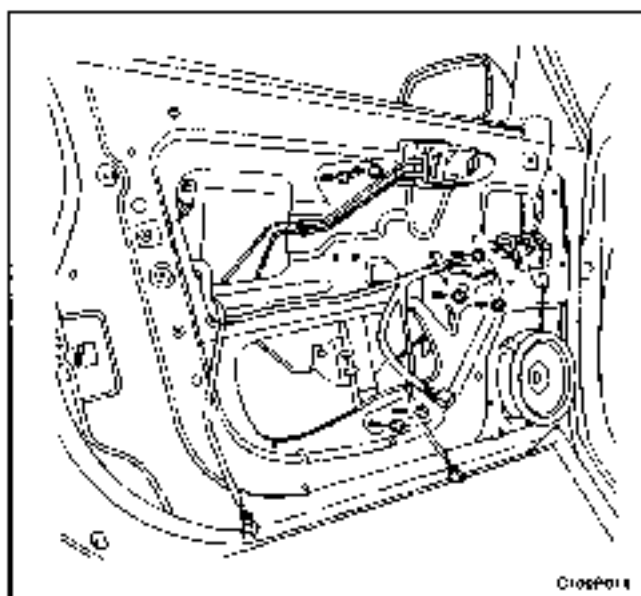
1. Install the lock cylinder with the retaining clip. (Front door shown, rear door similar.)
2. Connect the outside door handle lock rod.
3. Install the door seal trim. Refer to "Door Seal Trim" in this section.



## POWER WINDOW REGULATOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the door glass. Refer to Section 9L, *Glass and Mirrors*.
3. Disconnect the electrical connector.
4. Remove the nuts and the window regulator. (Front door shown, rear door similar.)



C109P014

### Installation Procedure

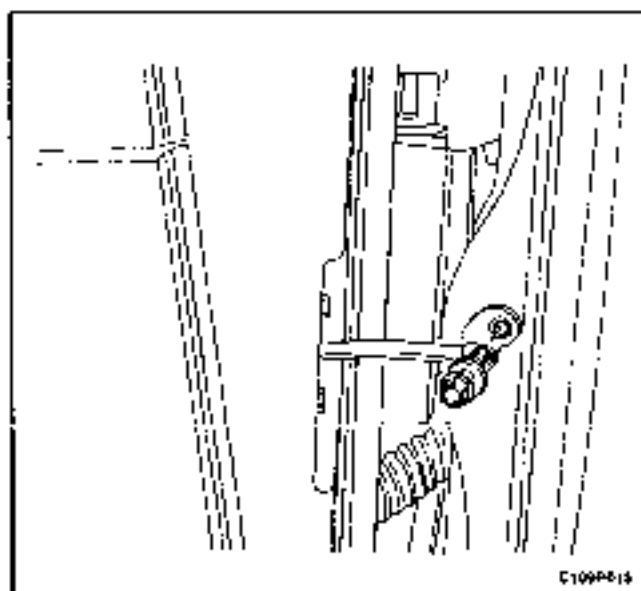
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the window regulator with the nuts. (Front door shown, rear door similar.)

#### Tighten

Tighten the window regulator nuts to 7 N·m (52 lb·ft).

2. Connect the electrical connector.
3. Install the door glass. Refer to Section 9L, Glass and Mirrors.
4. Connect the negative battery cable.

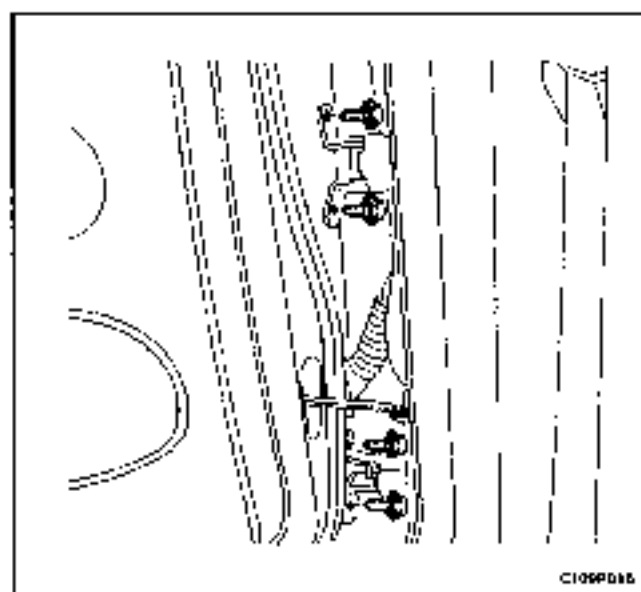


C109P015

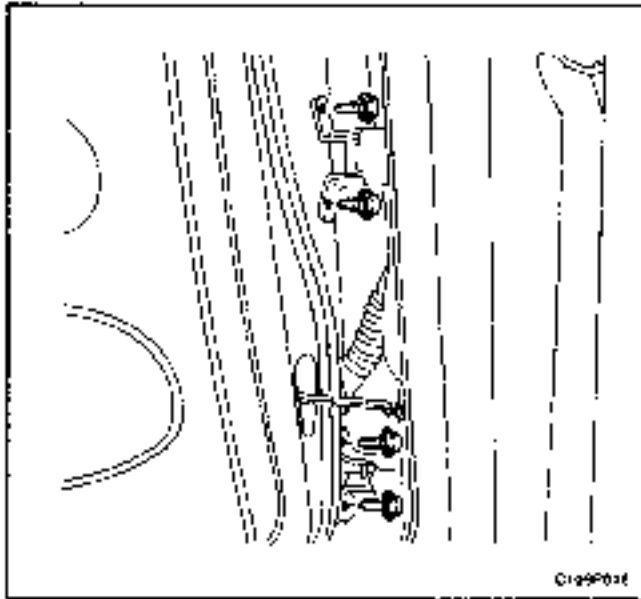
### DOOR ASSEMBLY

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the bolt and the door hold-open link from the body.
3. With the aid of another technician, remove the door hinge bolts and the front door. (Front door shown, rear door similar.)
4. Disconnect the body-to-door rubber grommet and the electrical connector.



C109P016



### Installation Procedure

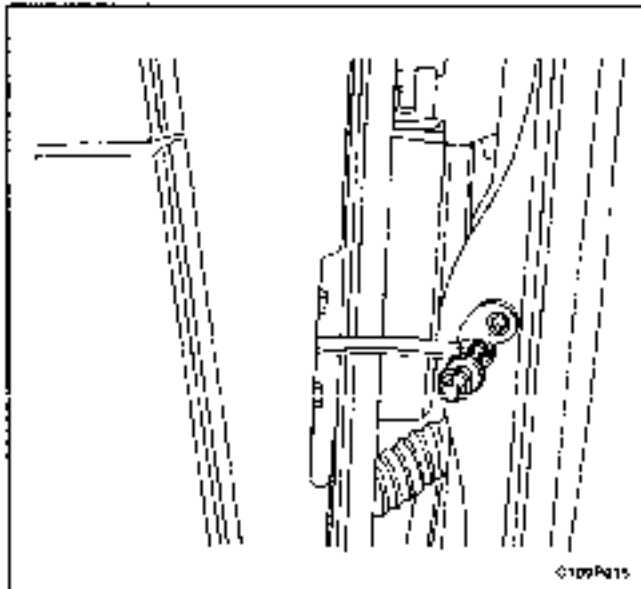
1. Connect the electrical connector and the body-to-door rubber grommet.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. With the aid of another technician, lightly secure the front door with the door hinge bolts. (Front door shown, rear door similar.)
3. Adjust the door for proper fit.

#### Tighten

Tighten the door hinge-to-body bolts to 39 N•m (29 lb-ft).

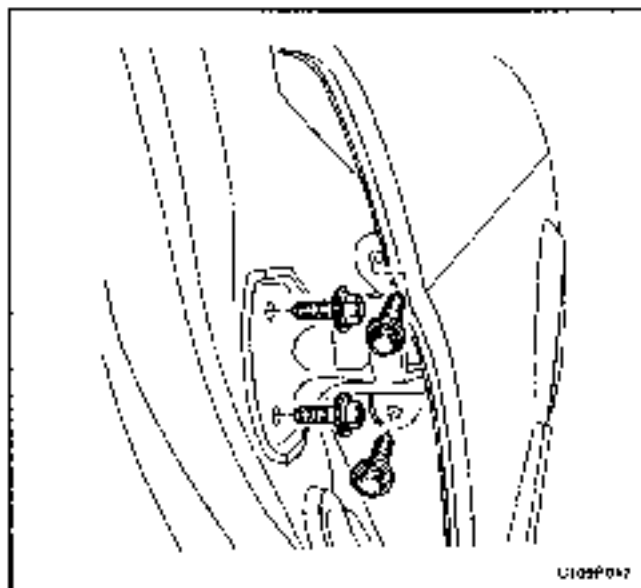


4. Install the door hold-open link to the body with the bolt.

#### Tighten

Tighten the door hold-open link-to-body bolt to 25 N•m (18 lb-ft).

5. Connect the negative battery cable.
6. Perform the waterleak test. Refer to Section 9I, Waterleaks.
7. Check for windnoise. Refer to Section 9J, Windnoise.

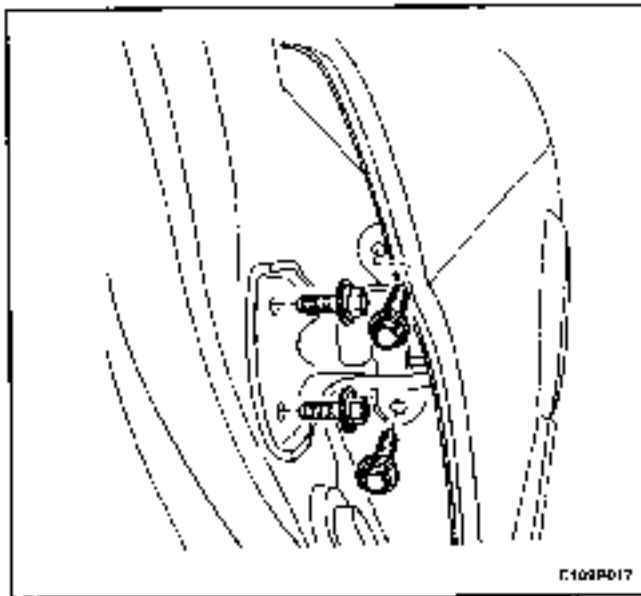


## DOOR HINGE

### Removal Procedure

1. With the aid of another technician, remove the bolts and the hinge from the door and the body. (Rear door shown, front door similar.)





C109P017

### Installation Procedure

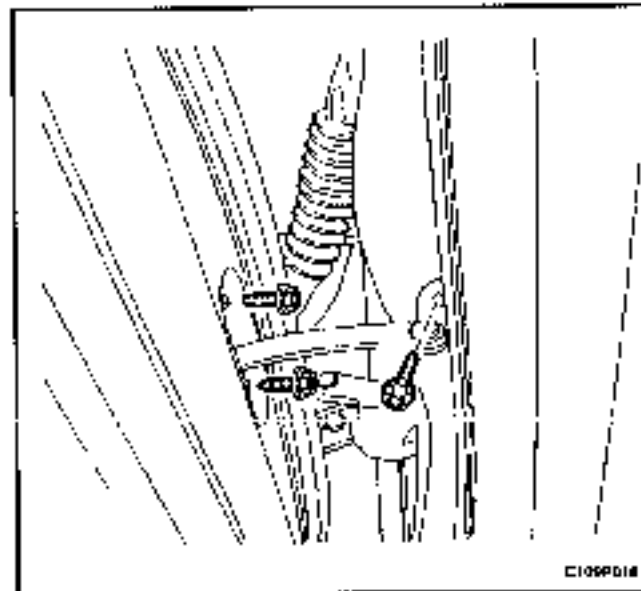
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. With the aid of another technician, install the hinge to the door and the body with the bolts. (Rear door shown, front door similar.)

### Tighten

Tighten the door hinge-to-body bolts to 39 N•m (29 lb-ft).

Tighten the door hinge-to-door bolts to 20 N•m (15 lb-ft).

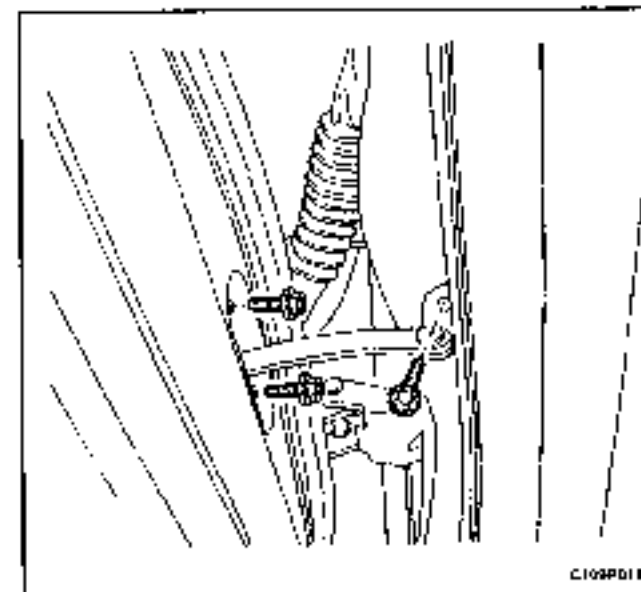


C109P018

### DOOR HOLD-OPEN LINK

#### Removal Procedure

1. Remove the door seal trim. Refer to "Door Seal Trim" in this section.
2. Remove the bolts on the door and on the body.
3. Remove the door hold-open link. (Front door shown, rear door similar.)



C109P019

#### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the door hold-open link to the door and the body with the bolts. (Front door shown, rear door similar.)

#### Tighten

Tighten the door hold-open link-to-body bolt to 25 N•m (18 lb-ft).

Tighten the door hold-open link-to-door bolts to 7 N•m (62 lb-in).

2. Install the door seal trim. Refer to "Door Seal Trim" in this section.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### DOOR LOCK STRIKER

The front and the rear door lock strikers each consist of a striker with two screws threaded into a floating cage plate in the B-pillars and C-pillars. The door is secured in the closed position when the door lock lock snaps over and engages the striker.

### CHILDPROOF REAR DOOR LOCK

The childproof rear door locks help prevent passengers, especially children, from opening the rear doors of the vehicle from the inside.

In order to activate these locks, move the levers of both rear doors to the lock position. Then, close both doors. Rear passengers will be unable to open the doors from inside of the vehicle.

In order to deactivate the childproof rear door lock, unlock the door from the inside of the vehicle and open the door from the outside. Move the lever to the unlock position. The rear door will now work normally.

### POWER DOOR LOCKS

The power door locks use a solenoid that is contained in each door lock assembly. The door locks are activated by the actuator on the inside door handle or by the lock cylinder on the driver's door only. When the driver's door is locked or unlocked by the actuator or lock cylinder, all doors are locked or unlocked accordingly.

### POWER WINDOWS

The power windows are controlled by electrical switches on the door panels and are operated by a motor at each window regulator. Each door has a switch to control its window and the driver's door has four switches to control all door windows on the vehicle. The windows are lowered by pressing the switch and raised by pulling up on the switch. The window will stop movement when the switch is released or when the window is completely open or closed.

The driver's window opens automatically. By pressing and releasing the switch, the driver's window will lower and will stop only when the switch is activated again or when the window is completely open.

The driver's door control also contains a window lock button that, when pressed, will prevent the operation of the front passenger door or the rear door windows.

## SECTION 9Q

# ROOF

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Power Sunroof Control Switch Screws	2	-	18
Passenger Assist Handle Screws	3	-	27
Sun Visor Screws	4	-	35
Sun Visor Support Screw	1.5	-	13
Sunroof Housing Bolts	10	-	89
Sunroof Motor Screws	3	-	27

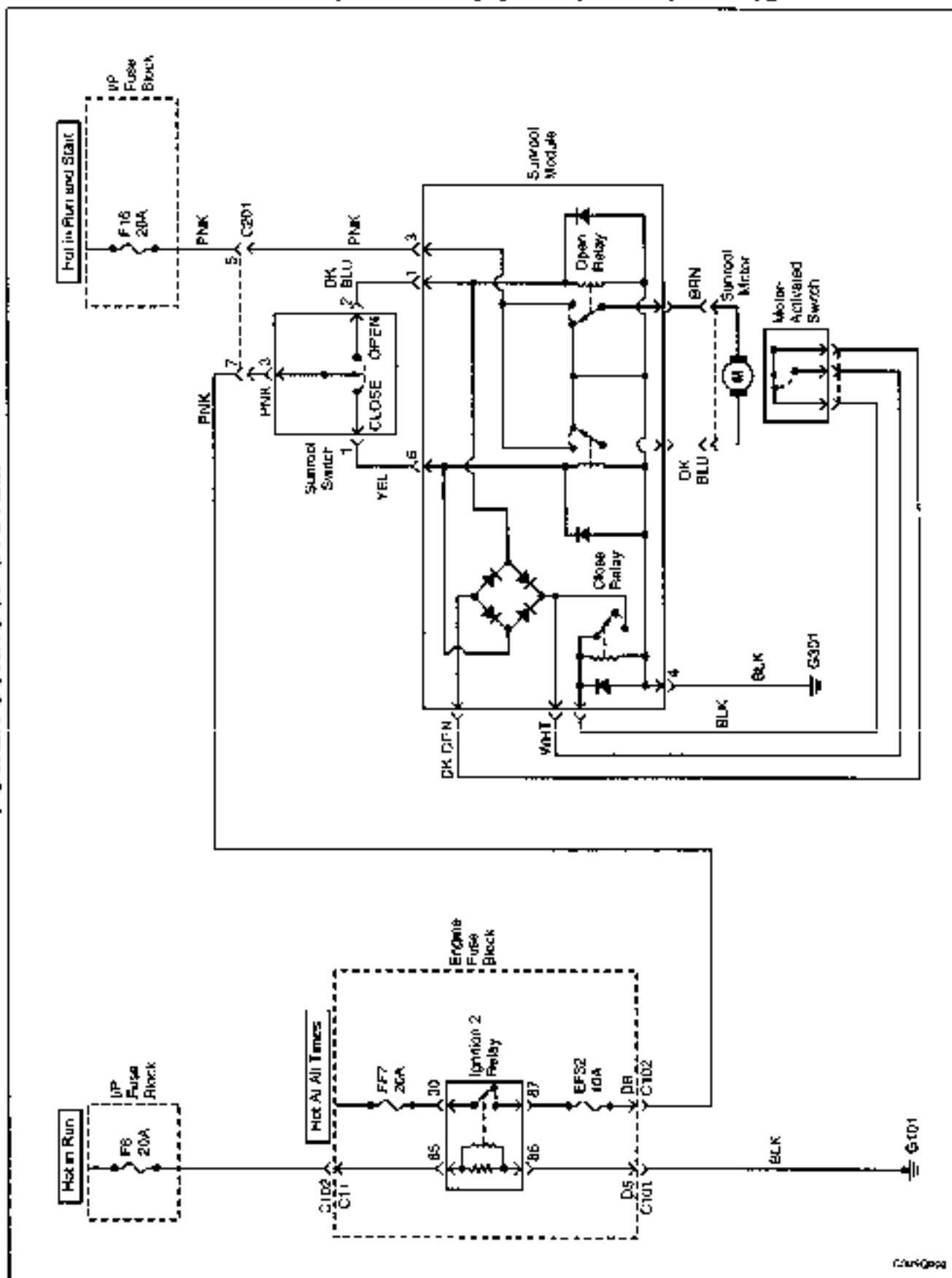
## SPECIAL TOOLS

### SPECIAL TOOLS TABLE

 <p>41090729</p>	<p><b>KM-475-B</b> <b>Trim Remover</b></p>
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# SCHEMATIC AND ROUTING DIAGRAMS

## POWER SUNROOF SYSTEM



## DIAGNOSIS

### POWER SUNROOF

**Test Description**

The number(s) below refer to step(s) on the diagnostic table.

3. The terminals are not marked on the relay socket, but the terminals are marked on the underside of the relay.

20. The meter will show the same voltage at both switch positions, but one of the switch positions will show reverse polarity.

#### Power Sunroof Does Not Work

Step	Action	Value	Yes	No
1	Check fuses F8, EF7, and F16. Is any fuse blown?	-	Go to Step 2	Go to Step 3
2	1. Check for a short circuit and repair if necessary. 2. Replace the fuse(s). Is the repair complete?	-	System OK	-
3	1. Remove the Ignition 2 relay. 2. Turn the ignition ON. 3. Check the voltage at the Ignition 2 relay socket, terminals 30 and 85. Does the voltmeter indicate the specified value at both locations?	11-14 v	Go to Step 5	Go to Step 4
4	Repair the power supply to the Ignition 2 relay. Is the repair complete?	-	System OK	-
5	1. With the Ignition 2 relay removed, use the underside of the relay to identify the location of terminal 86 and terminal 30 of the relay socket. 2. Connect a voltmeter between terminal 30 and terminal 86 of the relay socket. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 7	Go to Step 6
6	Repair the open circuit between ground and terminal 86 of the Ignition 2 relay. Is the repair complete?	-	System OK	-
7	1. Temporarily substitute a known good relay for the Ignition 2 relay. 2. Turn the Ignition ON. 3. Attempt to operate the sunroof. Does the sunroof operate?	-	Go to Step 9	Go to Step 8
8	1. Return the substituted relay to its original position. 2. Replace the Ignition 2 relay. Is the repair complete?	-	System OK	-
9	1. Turn the Ignition ON. 2. At the lamp/sunroof switch, check the voltage terminal 3 of the switch connector. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the open circuit between fuse EF32 and the sunroof switch. Is the repair complete?	-	System OK	-

## Power Sunroof Does Not Work (Cont'd)

Step	Action	Value	Yes	No
11	1. Turn the ignition ON. 2. With the sunroof switch connected, turn the switch to the closed position. 3. Check the voltage at terminal 1 of the switch connector. 4. With the sunroof switch connected, turn the switch to the open position. 5. Check the voltage at terminal 2 of the switch connector. Are both voltages equal to the specified value?	11-14 v	Go to Step 13	Go to Step 12
12	Replace the sunroof switch. Is the repair complete?	-	System OK	-
13	1. Disconnect the sunroof module six-pin electrical connector. 2. Use an ohmmeter to measure the resistance between terminal 4 and ground. Is the resistance within the specified value?	$\approx 0 \Omega$	Go to Step 15	Go to Step 14
14	Repair the open circuit between ground and terminal 4 of the sunroof module connector. Is the repair complete?	-	System OK	-
15	1. With the sunroof module still disconnected, turn the ignition ON. 2. Check the voltage at terminal 3 of the connector for the sunroof module. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 17	Go to Step 16
16	Repair the open circuit between fuse F16 and terminal 3 of the sunroof module. Is the repair complete?	-	System OK	-
17	1. With the sunroof module still disconnected, turn the ignition ON. 2. Check the voltage at terminal 6 of the sunroof module with the sunroof switch in the CLOSE position. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 19	Go to Step 18
18	Repair the open circuit between the sunroof switch and the sunroof module. Is the repair complete?	-	System OK	-
19	1. With the sunroof module still disconnected, turn the ignition ON. 2. Check the voltage at terminal 1 of the sunroof module with the sunroof switch in the OPEN position. Does the voltmeter indicate the specified value?	11-14 v	Go to Step 20	Go to Step 18
20	1. Reconnect the sunroof module. 2. Remove the sunroof motor, but leave the connectors attached. 3. Attempt to operate the motor in both directions by using the sunroof switch. Does the motor operate?	-	Go to Step 21	Go to Step 22
21	Repair the jammed sunroof mechanism. Is the repair complete?	-	System OK	-

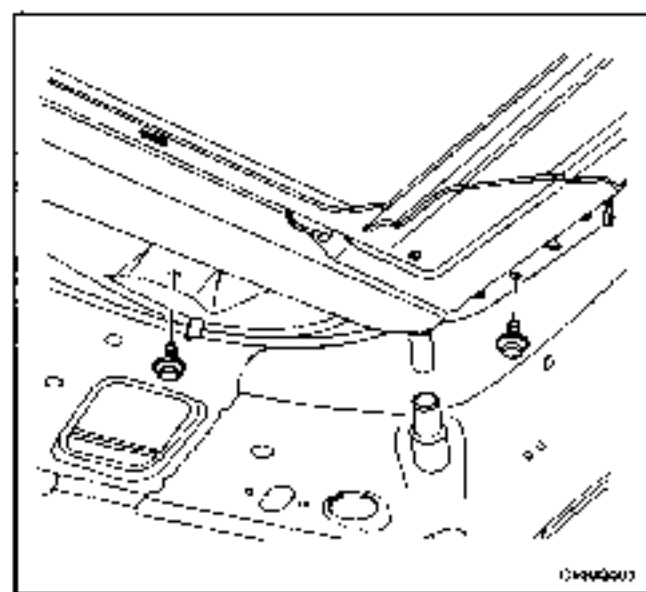
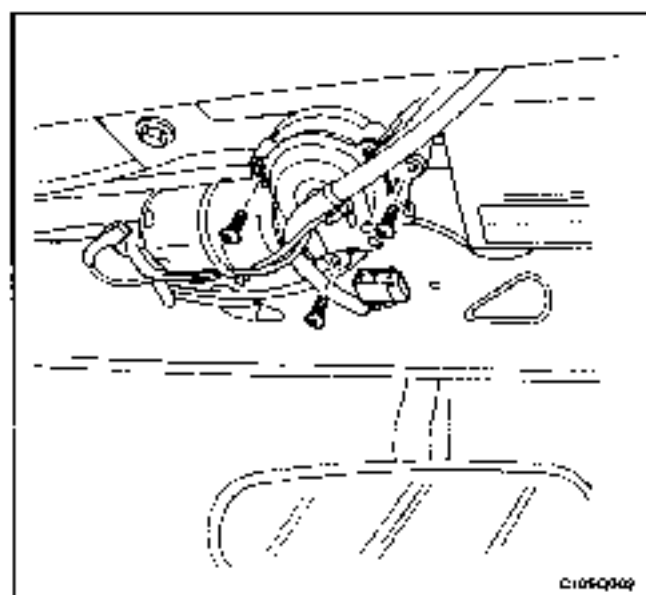
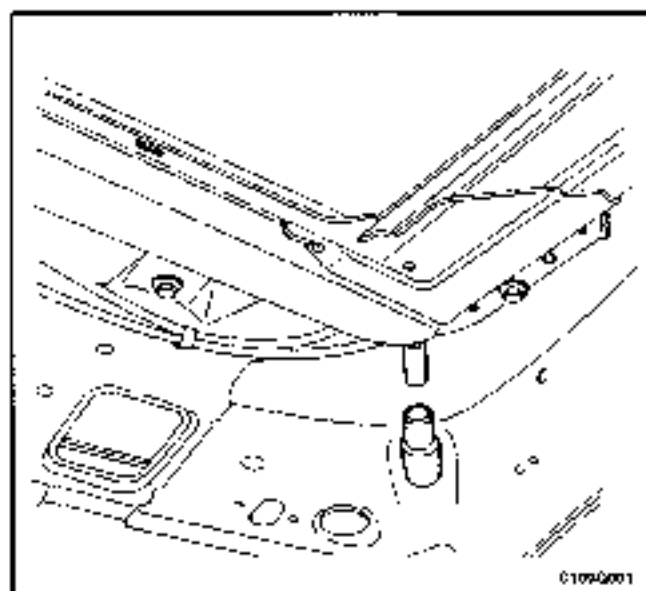
## Power Sunroof Does Not Work (Cont'd)

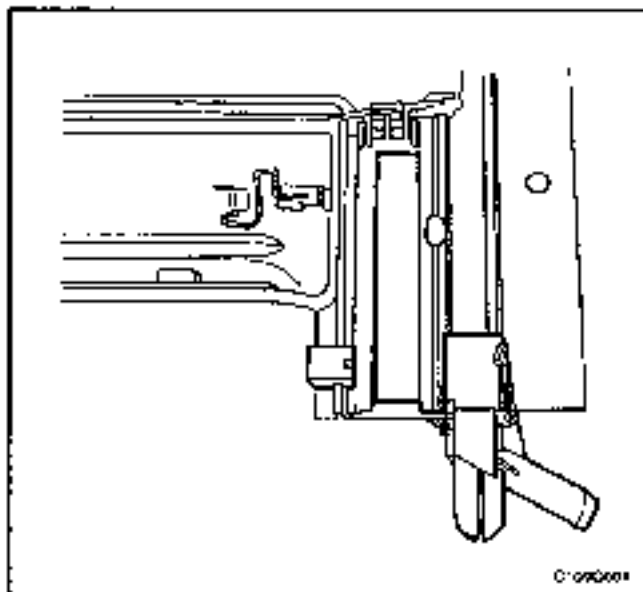
Step	Action	Value	Yes	No
22	1. Disconnect both of the one-wire connectors at the sunroof motor. 2. Connect a voltmeter between the two 1-wire connectors. 3. Turn the ignition ON. 4. Turn the sunroof switch to the CLOSE position and observe the voltmeter reading. 5. Turn the sunroof switch to the OPEN position and observe the voltmeter reading. Does the voltmeter indicate the specified value when the switch is each position (OPEN and CLOSE)?	11-14 v	Go to <i>Step 24</i>	Go to <i>Step 23</i>
23	Replace the sunroof module. Is the repair complete?	-	System OK	-
24	Replace the sunroof motor. Is the repair complete?	-	System OK	-



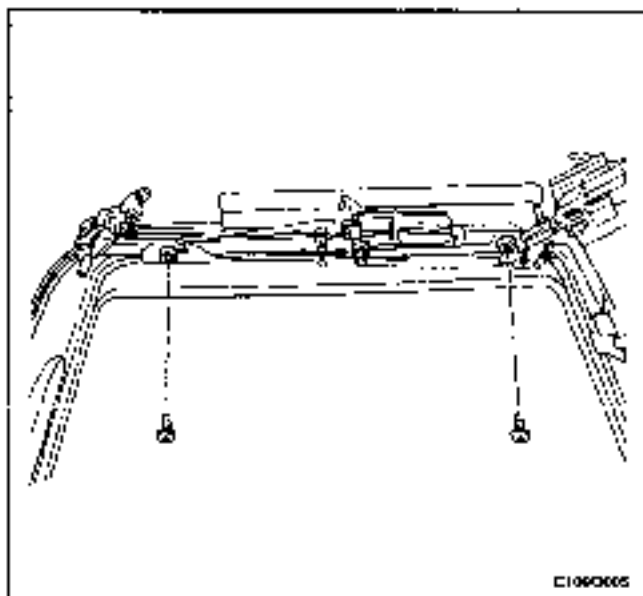
**MAINTENANCE AND REPAIR****ON-VEHICLE SERVICE****POWER SUNROOF****Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the headliner. Refer to "Formed Headliner" in this section.
3. Remove the drain hoses.
4. Disconnect the electrical connectors.
5. Remove the screws and the motor.
6. Remove the motor control module.
7. Remove the bolts and the housing from the vehicle.

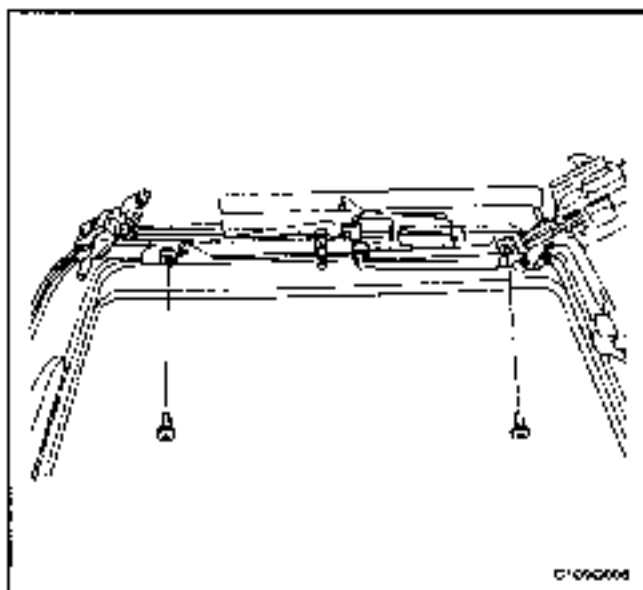




8. Remove the rubber end caps.
9. Remove the drain nozzles.
10. Remove the shade stops.
11. Remove the glass stops.



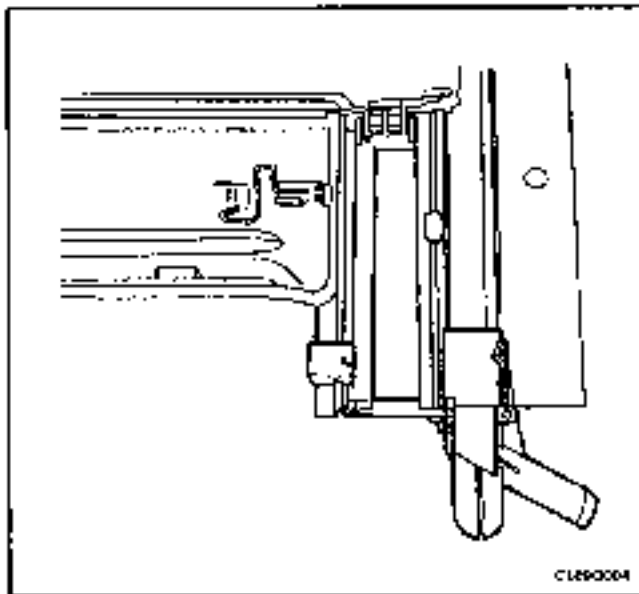
12. Remove the shade.
13. Remove the glass and the frame from the housing.
14. Remove the plastic trim.
15. Remove the screws and the glass from the frame.



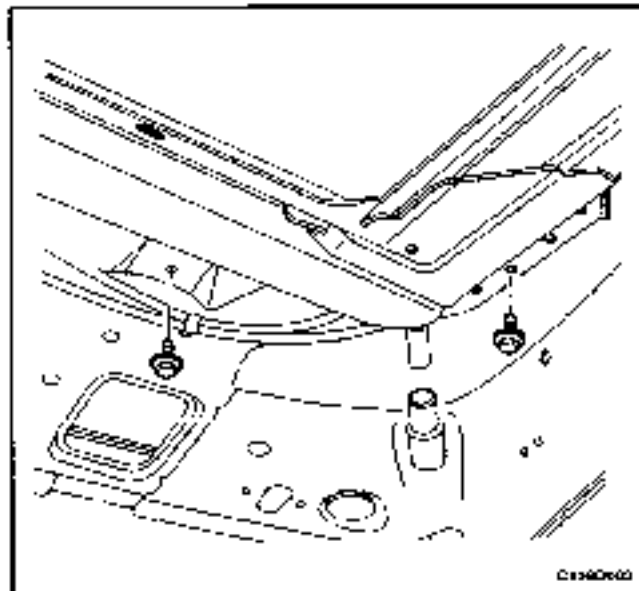
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the glass to the frame with the screws.



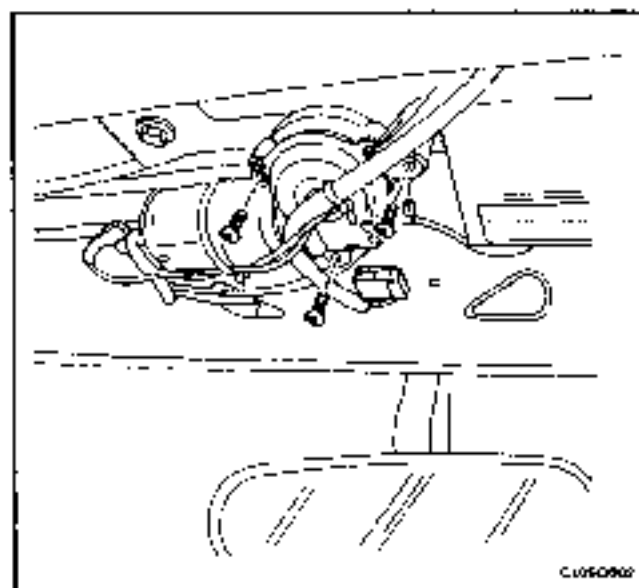
2. Install the plastic trim.
3. Install the glass and the frame to the housing
4. Install the shade.
5. Install the glass stops
6. Install the shade stops.
7. Install the drain nozzles
8. Install the rubber end caps.



9. Install the housing to the roof of the vehicle with the bolts.

**Tighten**

Tighten the sunroof housing bolts to 10 N•m (89 lb-in).

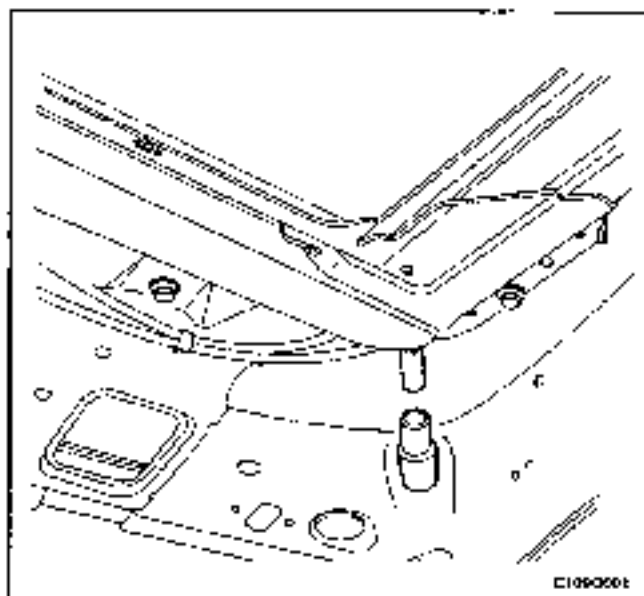


10. Install the motor control module
11. Install the motor with the screws

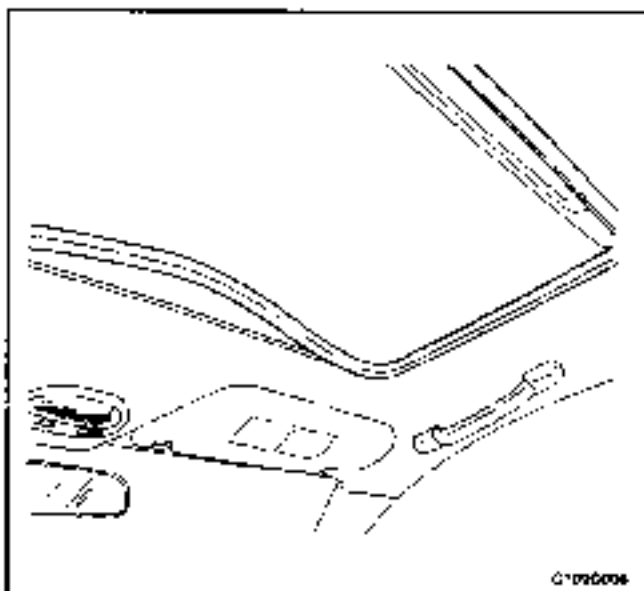
**Tighten**

Tighten the sunroof motor screws to 3 N•m (27 lb-in).

12. Connect the electrical connectors



13. Install the drain hoses.
14. Install the headliner. Refer to "Formed Headliner" in this section.
15. Connect the negative battery cable.



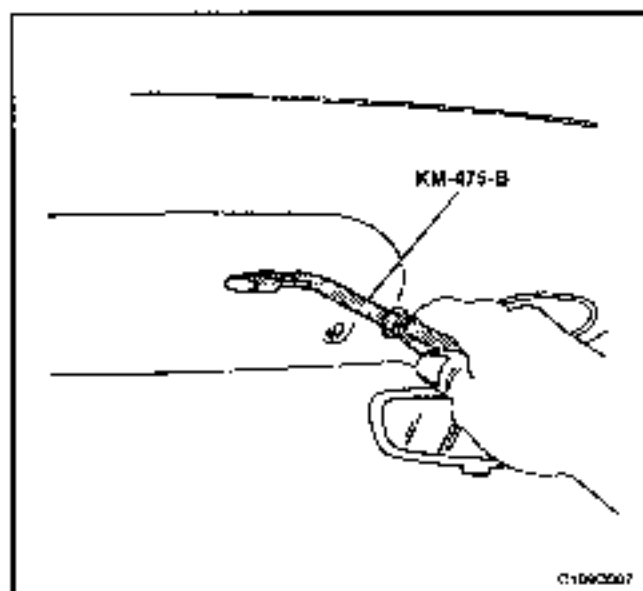
## FORMED HEADLINER

### Tools Required

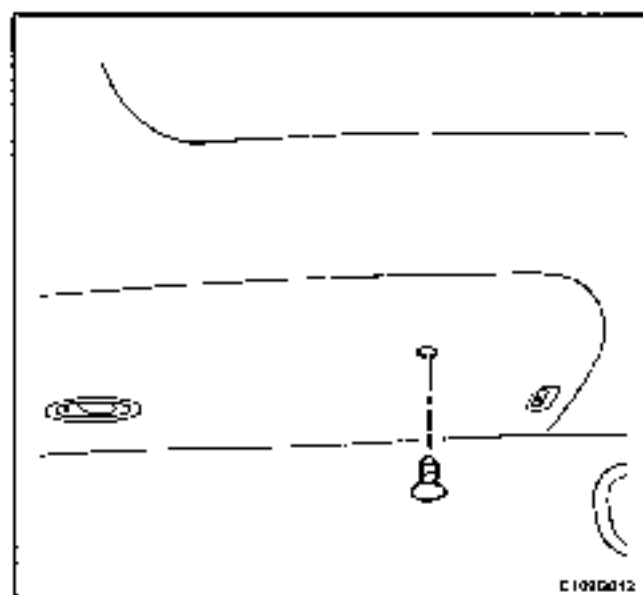
KM-475-B Trim Remover

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the sunroof molding, if equipped.
3. Remove the passenger assist handles. Refer to "Passenger Assist Handles" in this section.
4. Remove the plastic retaining clips in the headliner on the driver's side.
5. Remove the sun visors. Refer to "Sun Visors with Vanity Mirror" in this section.
6. Remove the power sunroof control switch, if equipped. Refer to "Power Sunroof Control Switch" in this section.
7. Remove the ultrasonic sensor. Refer to Section 9T, Remote Keyless Entry and Anti-Theft System.
8. Remove the A-, B-, and C-pillar trim panels. Refer to Section 9G, Interior Trim.

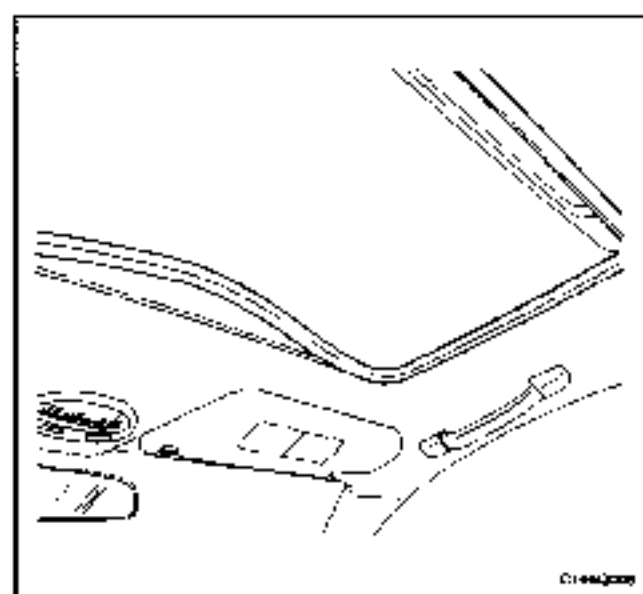


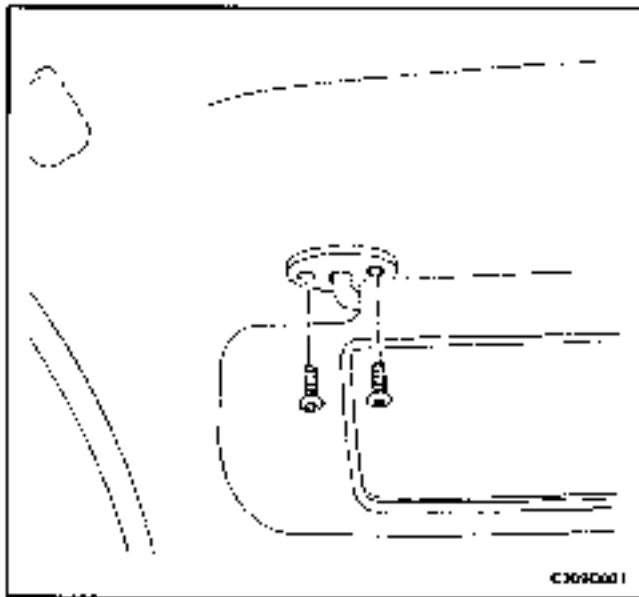
9. Remove the plastic retainers in the headliner using the trim remover KM-475-B.
10. Recline both front seats.
11. Remove the headliner through a rear door.



### Installation Procedure

1. Recline both front seats.
2. Insert the headliner through a rear door.
3. Install the headliner behind the seats around the doors.
4. Install the plastic retainers.
5. Install the A-, B-, and C-pillar trim panels. Refer to Section 9G, Interior Trim.
6. Install the power sunroof switch, if equipped. Refer to "Power Sunroof Control Switch" in this section.
7. Install the sun visors. Refer to "Sun Visors with Vanity Mirror" in this section.
8. Install the plastic retainers in the headliner on the driver's side.
9. Install the passenger assist handles. Refer to "Passenger Assist Handles" in this section.
10. Install the ultrasonic sensor. Refer to Section 9T, Remote Keyless Entry and Anti-Theft System.
11. Install the sunroof molding, if equipped.
12. Connect the negative battery cable.

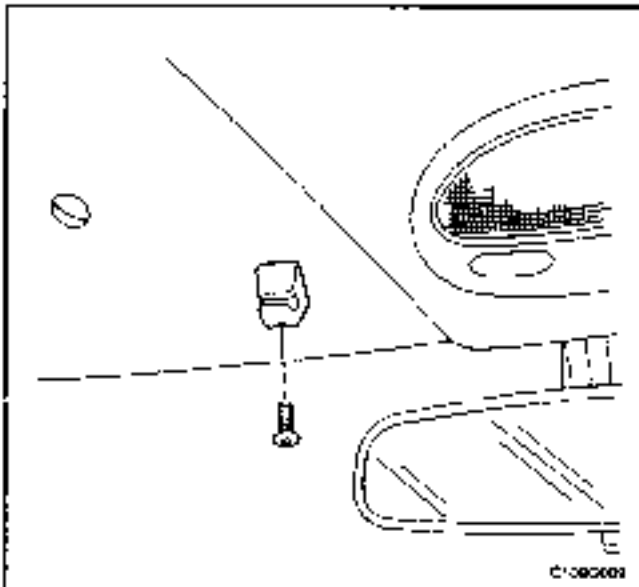




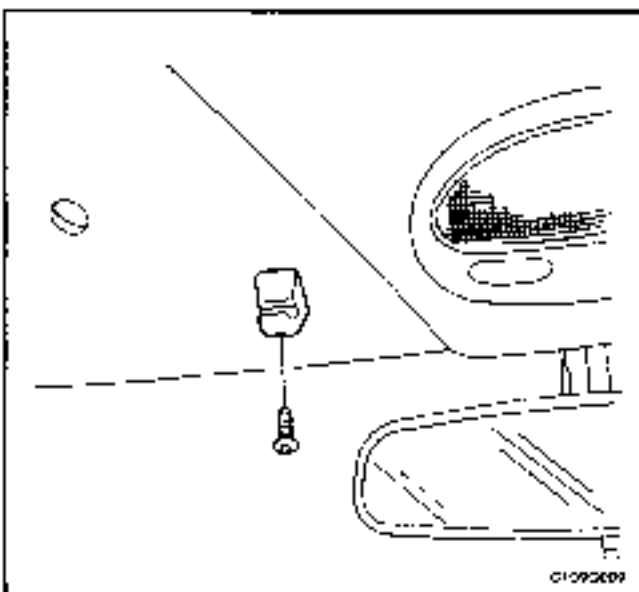
## SUN VISORS WITH VANITY MIRROR

### Removal Procedure

1. Remove the screws and the sun visor from the headliner.
2. Disconnect the vanity mirror electrical connector. Refer to Section 9B, *Lighting Systems*.



3. Remove the screw and the sun visor support from the headliner.



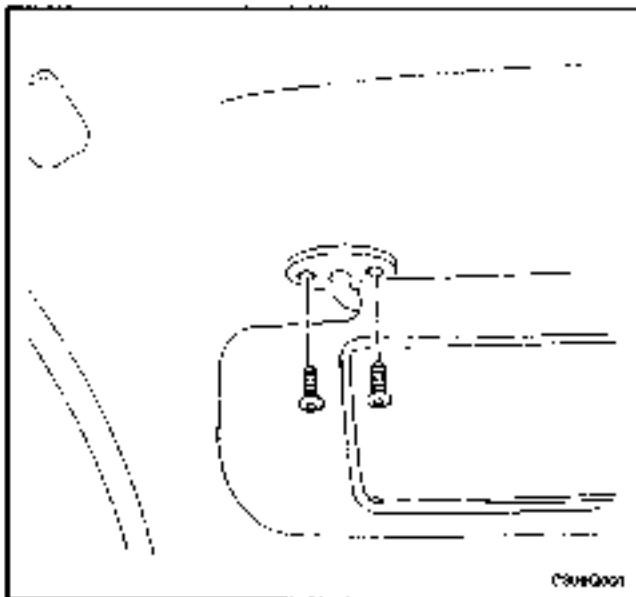
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the sun visor support to the headliner with the screw.

### Tighten

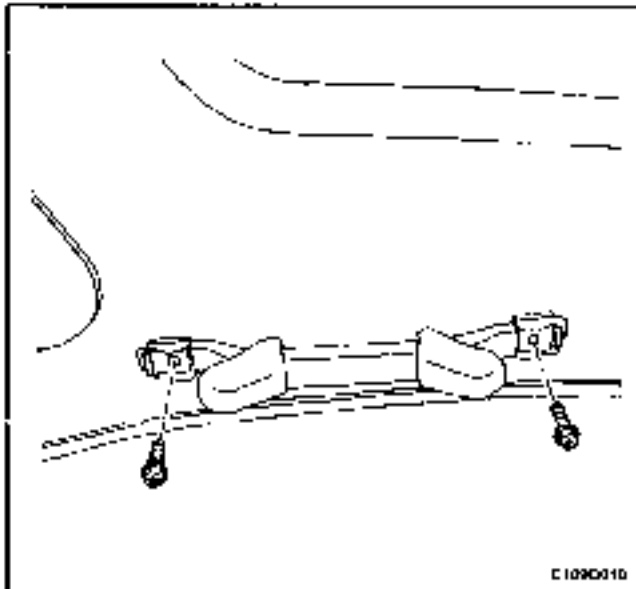
Tighten the sun visor support screw to 1,5 N·m (13 lb-in).



2. Connect the vanity mirror electrical connector. Refer to *Section 9B, Lighting Systems*.
3. Install the sun visor to the headliner with the screws.

**Tighten**

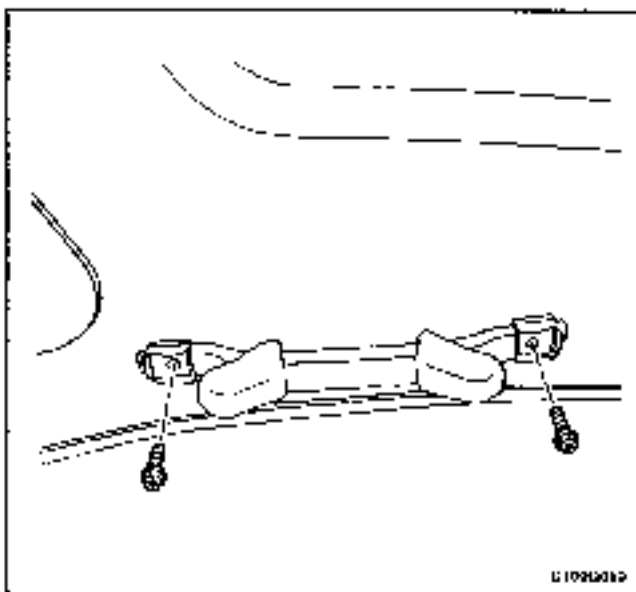
Tighten the sun visor screws to 4 N•m (35 lb-in)



**PASSENGER ASSIST HANDLES**

**Removal Procedure**

1. Reposition the plastic caps to reveal the assist handle screws.
2. Remove the screws and the assist handle from the headliner.



**Installation Procedure**

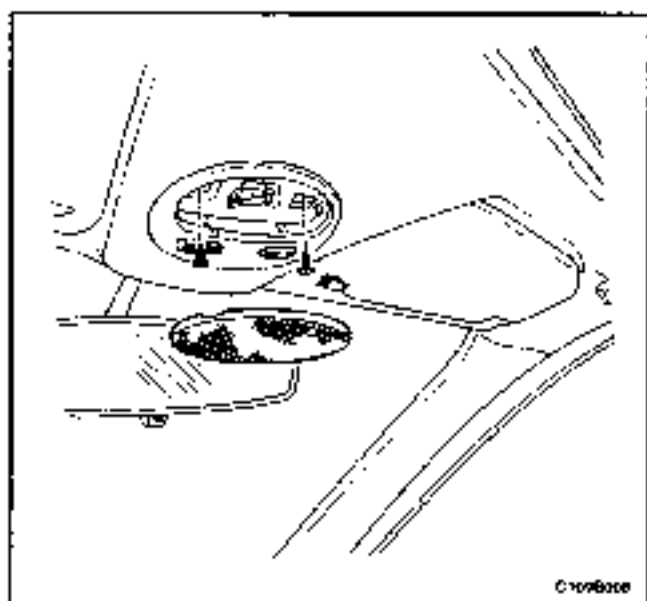
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the assist handle to the headliner with the screws.

**Tighten**

Tighten the passenger assist handle screws to 3 N•m (27 lb-in).

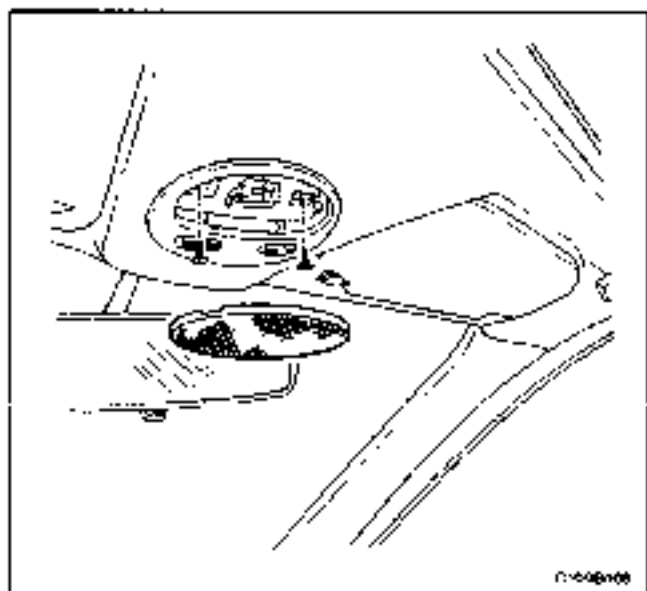
2. Install the plastic caps over the assist handle screws.



## POWER SUNROOF CONTROL SWITCH

### Removal Procedure

1. Disconnect the negative battery cable.
2. Pry off the interior courtesy lamp lens.
3. Remove the screws and the switch.
4. Disconnect the electrical connector.



### Installation Procedure

1. Connect the electrical connector.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the sunroof control switch with the screws.

### Tighten

Tighten the power sunroof control switch screws to 2 N•m (18 lb-in).

3. Install the interior courtesy lamp lens.
4. Connect the negative battery cable.



## GENERAL DESCRIPTION AND SYSTEM OPERATION

### ROOF

The roof is a one-piece painted metal unit which incorporates a single solid headliner. There are two moldings, one per side on the vehicle's roof, which enclose and hide the roof rail seams. The roof moldings are serviceable as individual units.

The one-piece formed headliner consists of a molded substrate covered with a foam-backed cloth facing. The one-piece construction requires the headliner be serviced as a complete assembly.

### POWER SUNROOF/SUNROOF CONTROL SWITCH

The sunroof is

- Intended to provide light and air through the roof of the vehicle.
- Built into the roof.
- Made of glass.
- Equipped with a sunshade that opens and closes manually.
- Powered by an electric motor.
- Controlled by a toggle switch built into the interior courtesy lamp assembly.

The sunroof control switch is

- A toggle button located on the right side of the interior courtesy lamp assembly.

To operate the sunroof,

- The ignition must be in the ON position.

### Tilting the Sunroof, Open and Closed

To tilt open the rear end of the sunroof,

- Press and hold the forward portion of the toggle button until the sunroof tilts open.

To close the sunroof from a tilted-open position

- Press and hold the rear portion of the toggle button until the sunroof tilts closed.

### Sliding the Sunroof, Open and Closed

To slide open the sunroof

- Press the rear portion of the toggle button until the sunroof slides. If the sun shade is closed, the sunroof will pull the sunshade open when the sunroof slides open.

To close the sunroof from a slid-open position,

- Press the forward portion of the toggle button until the sunroof slides closed.

### SUN VISORS WITH VANITY MIRROR

The sun visors swing down in order to block out glare. They also swing to the side when they are released from the support. To replace the vanity mirror lamp, refer to Section 9B, *Lighting Systems*.

### PASSENGER ASSIST HANDLES

There is a passenger assist handle for each rear outboard seat and for the front passenger seat. Passengers can use these handles to assist in keeping their balance over rough roads or during sharp turns.

### COAT HOOKS

The coat hooks are located on the left and the right rear passenger assist handles.



## SECTION 9R

# BODY FRONT END

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
A-Pillar Fender Bolt	10	-	89
Cowl Vent Grille Screws	3	-	27
Front Fascia-to-Fender Bolts	2.5	-	22
Front of Fender Bolts	10	-	89
Front Wheel Well Splash Shield Screws	2	-	18
Hinge Bolts	20	15	-
Hood-to-Hinge Bolts	20	15	-
Hood Latch Bolts	10	-	89
Hood Release Handle Screw	2.5	-	22
Lower Fender Bolts	10	-	89
Radiator Grille Bolts	10	-	89
Radiator Grille Nuts	4	-	35
Radiator Grille Screws	2	-	18
Resonator Bolt	9	-	80
Towing Eye Bolts	25	18	-
Upper Fender Bolts	10	-	89
Washer Reservoir Bolt	9	-	80

## SPECIAL TOOLS

### SPECIAL TOOLS TABLE

 <p>4109G028</p>	<p><b>KM-475-B</b> <b>Trim Remover</b></p>
--	--

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### LUBRICATION

The hood hinges and the locking mechanisms require periodic lubrication for proper operation. Refer to Section 08, *General Information* for the specific types and intervals of lubrication.

#### FASTENERS

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

Many aluminum components are used on current models. Aluminum in contact with steel may corrode rapidly if it is not protected by special finishes or isolators.

The fasteners used have a special finish which provides adequate protection from corrosion. These special fasteners differ in color in order to easily identify them from the standard metric fasteners which are medium blue in color.

When replacing fasteners, avoid substituting otherwise similar fasteners in the same location.

#### ANTICORROSION MATERIALS

In order to provide rust resistance, anticorrosion materials have been applied to the interior surfaces of most of the metal panels. When you service these panels, properly re-coat them with a service-type anticorrosion material if any of the original material has been disturbed.

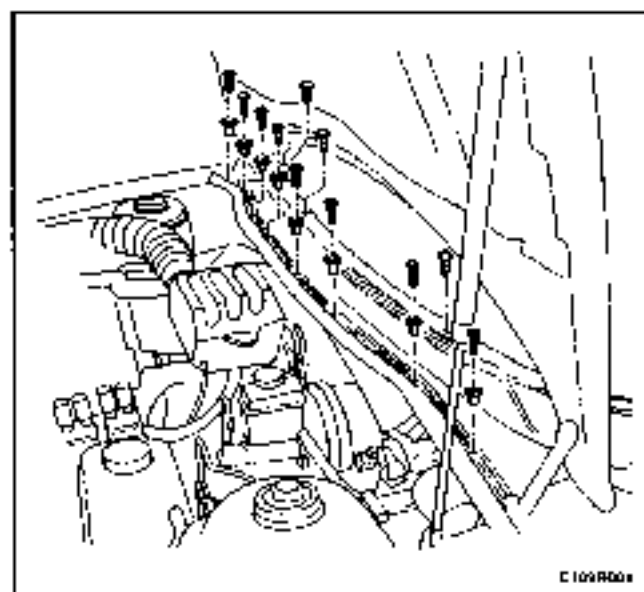
#### FRONT END SEALING

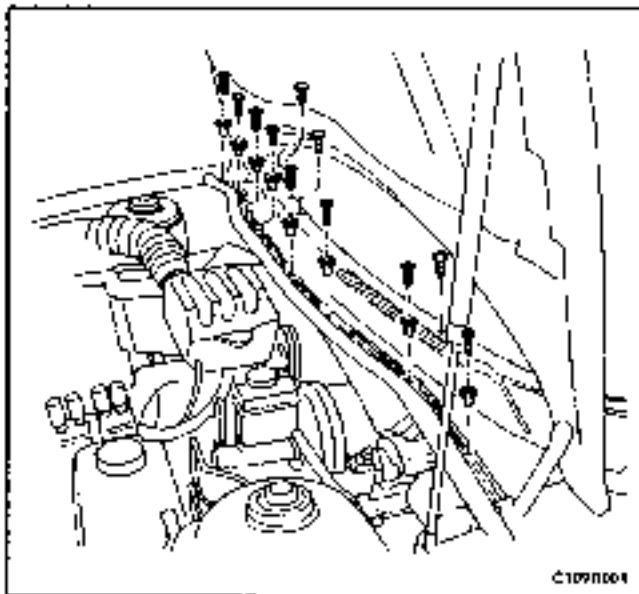
All locations where water leaks may occur are sealed during production with high quality, durable sealers. If it becomes necessary to reseal specific areas, use a high quality sealer of medium-bodied consistency which will retain its flexible characteristics after curing and can be painted if necessary.

#### COWL VENT GRILLE

##### Removal Procedure

1. Raise the hood.
2. Remove the wiper arms. Refer to Section 9D, *Wipers/Washer Systems*.
3. Remove the cowl vent grille screws and the two-piece grille.





### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the two-piece grille and the cowl vent grille screws.

### Tighten

Tighten the cowl vent grille screws to 3 N·m (27 lb·in).

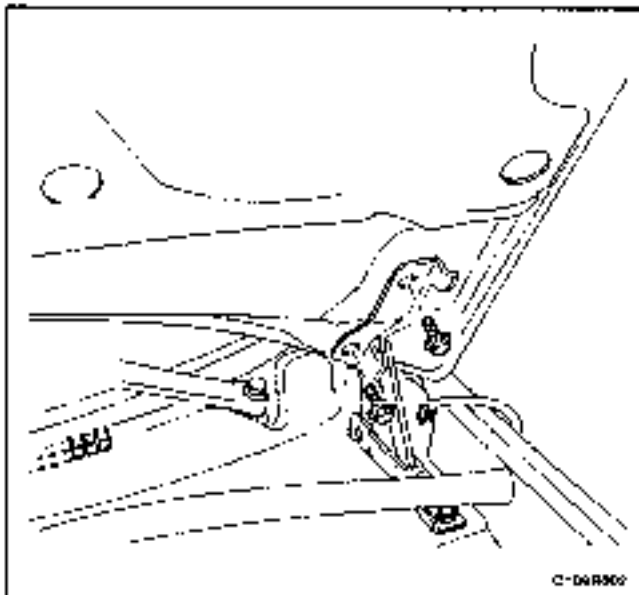
2. Install the wiper arms. Refer to Section 9D, *Wipers/Washer System*.
3. Lower the hood.

## HOOD

### Removal Procedure

**Important:** Install protective coverings over the fenders and the windshield in order to prevent damage to the paint, the glass and the moldings when you are removing and installing the hood.

1. Raise and support the hood.
2. Mark the position of the hinge to the hood in order to aid in alignment during installation.
3. Remove the washer hoses from the hood.
4. Remove the hood struts. Refer to "Hood Strut" in this section.
5. Remove the bolts retaining the hood to both hinges.
6. With the aid of another technician, remove the hood from the hinges.



### Installation Procedure

1. With the aid of another technician, position the hood in the location marked during removal.

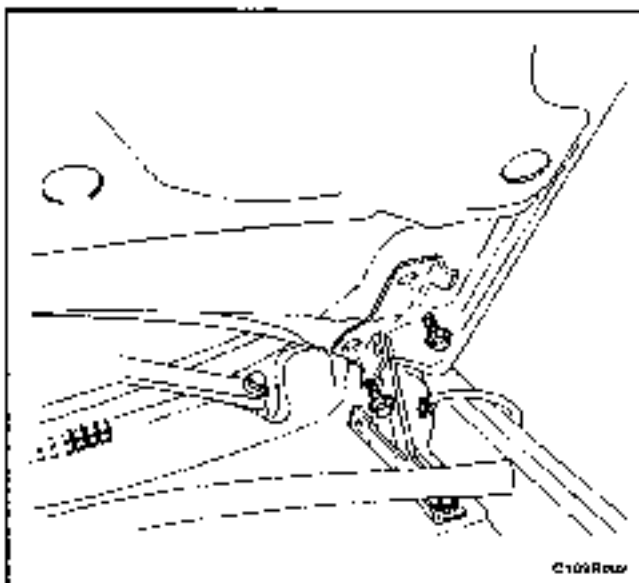
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

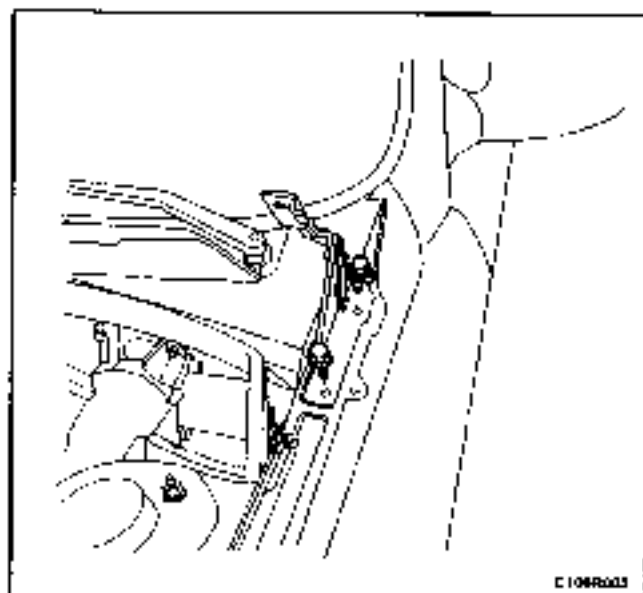
2. Install the two bolts securing the hood to each hinge.

### Tighten

Tighten the hood-to-hinge bolts to 20 N·m (15 lb·ft).

3. Install the hood struts. Refer to "Hood Strut" in this section.
4. Inspect the hood for proper alignment.
5. Install the washer hoses to the hood.



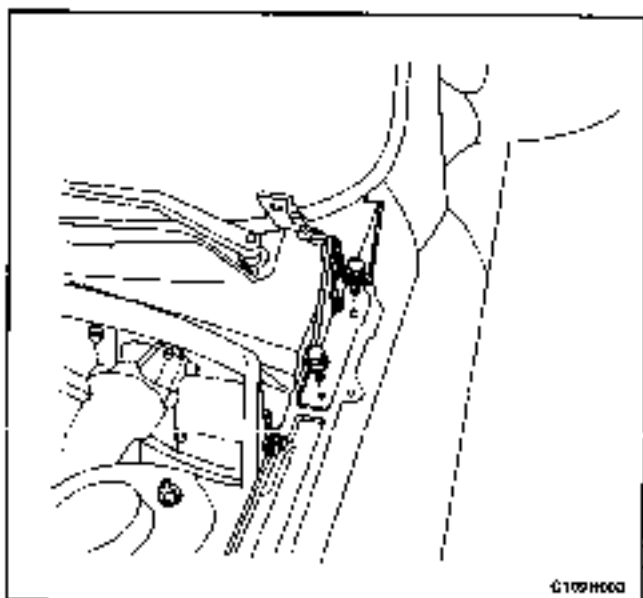


C108R003

## HOOD HINGES

### Removal Procedure

1. Remove the hood. Refer to "Hood" in this section.
2. Reposition the cowl vent grille weatherstrip.
3. Remove the bolts and the hinge.



C109H000

### Installation Procedure

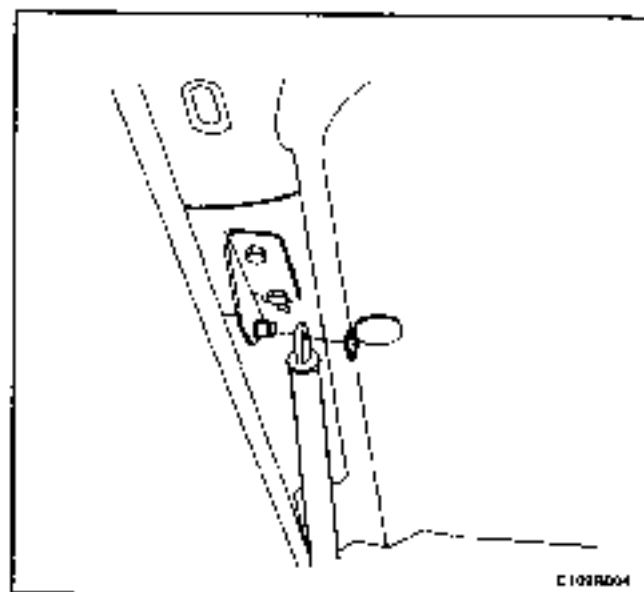
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the hinge with the bolts.

#### Tighten

Tighten the hinge bolts to 20 N·m (15 lb-ft).

2. Reposition the cowl vent grille weatherstrip to its original position.
3. Install the hood. Refer to "Hood" in this section.

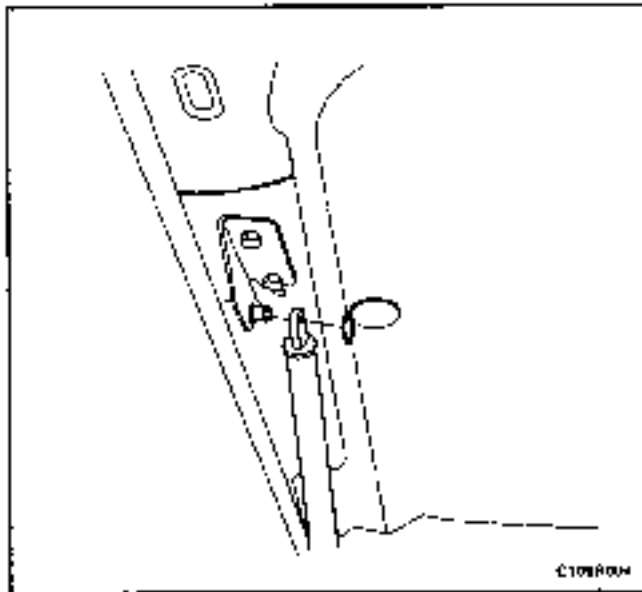


C103R004

## HOOD STRUT

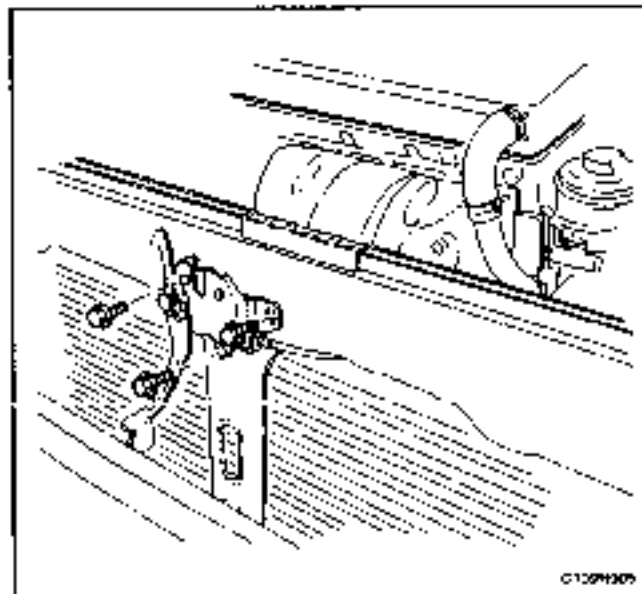
### Removal Procedure

1. Raise and support the hood.
2. Remove the retaining clips and the hood strut.



### Installation Procedure

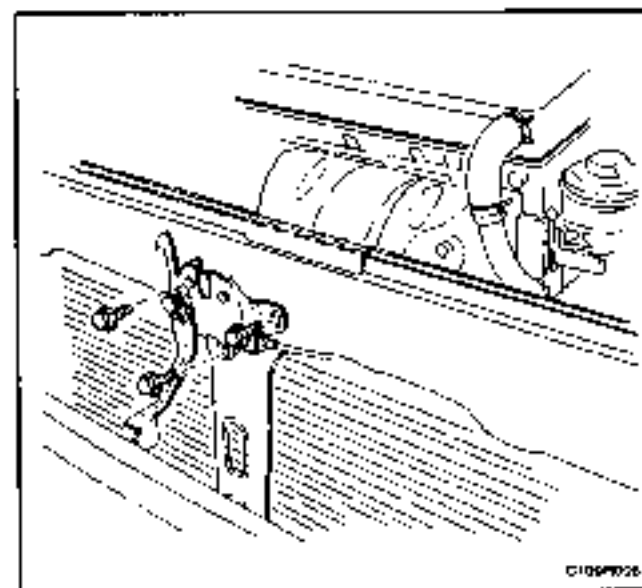
1. Install the retaining clips and the hood strut.
2. Close the hood.



### HOOD SECONDARY LATCH

#### Removal Procedure

1. Open the hood.
2. Mark the position of the hood latch on the radiator support in order to aid in alignment during installation.
3. Remove the bolts and the hood latch.
4. Disconnect the hood release cable.



#### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

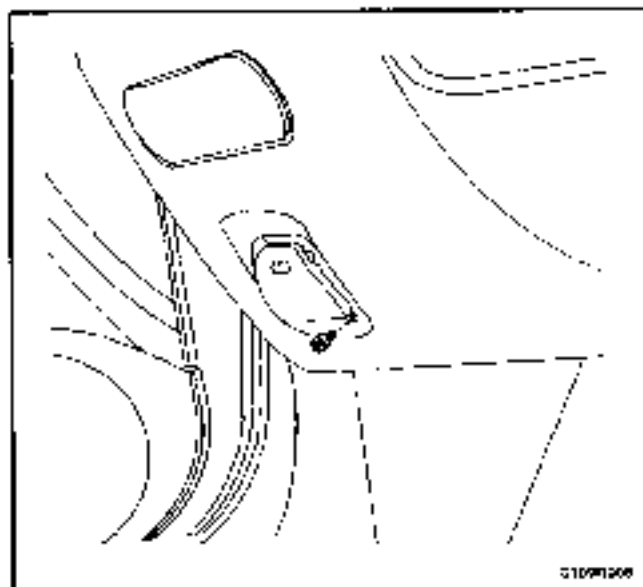
1. Connect the hood release cable to the latch.
2. Position the hood latch in the location marked during removal.
3. Install the hood latch with the bolts.

#### Tighten

Tighten the hood latch bolts to 10 N•m (89 lb•in).

4. Close the hood.



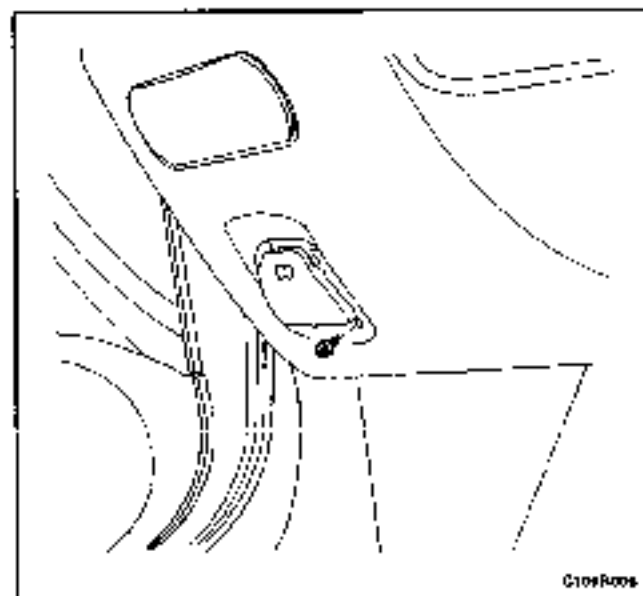


## HOOD LATCH RELEASE CABLE

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Remove the hood release handle.
2. Remove the knee bolster and the hood release handle.
3. Remove the cable from the hood release handle.
4. Remove the hood secondary latch. Refer to "Hood Secondary Latch" in this section.
5. Remove the cable from the engine compartment.



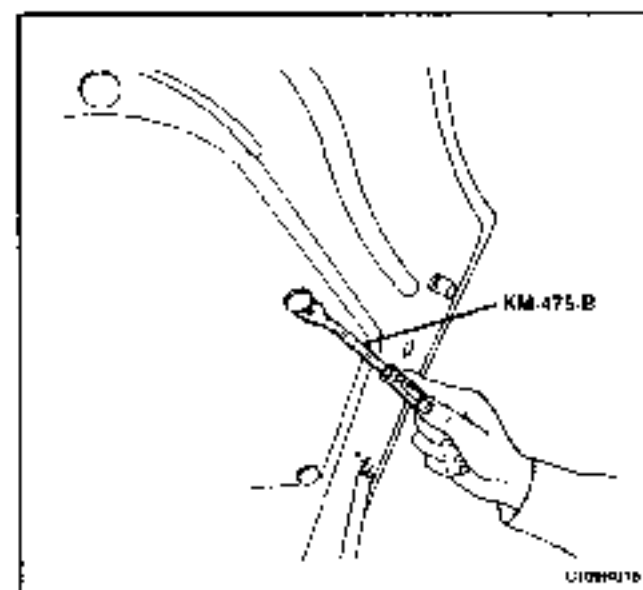
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the cable through the engine compartment.
2. Install the hood secondary latch. Refer to "Hood Secondary Latch" in this section.
3. Install the cable to the hood release handle.
4. Install the hood release handle and the knee bolster with the screw.

### Tighten

Tighten the hood release handle screw to 2.5 N·m (22 lb-in).



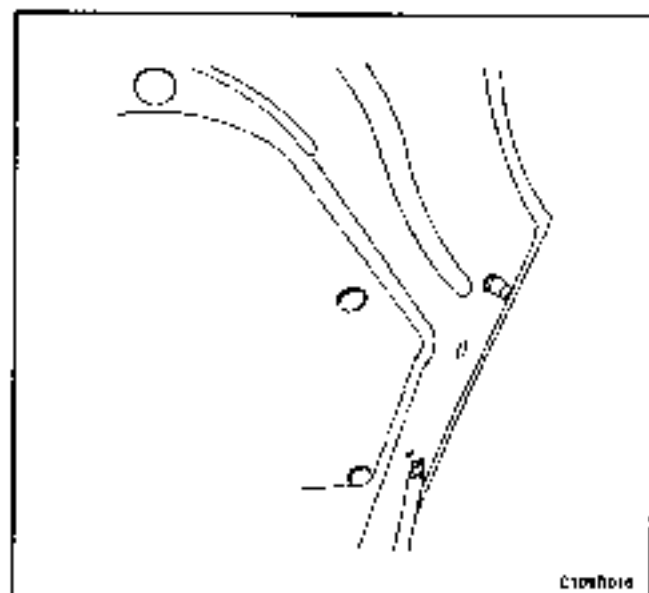
## HOOD INSULATION

### Tools Required

KM-475-B Trim Remover

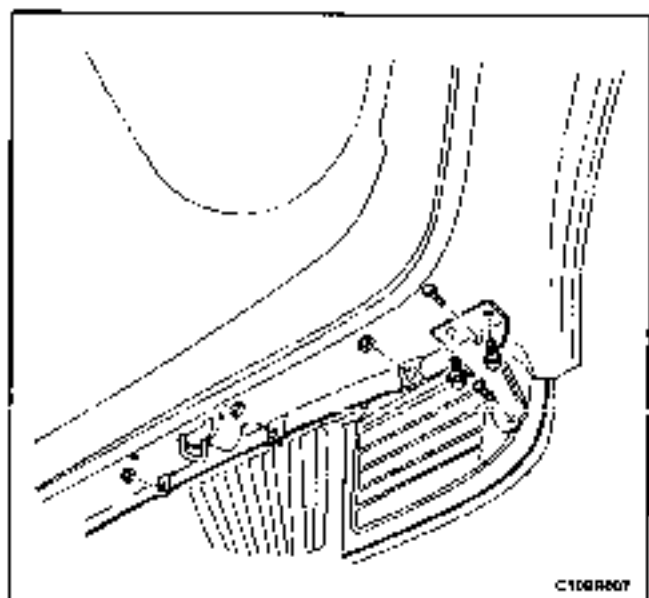
### Removal Procedure

1. Open the hood.
2. Remove the washer hose from the hood.
3. Remove the retaining clips using the trim remover KM-475-B.
4. Remove the hood insulation.



### Installation Procedure

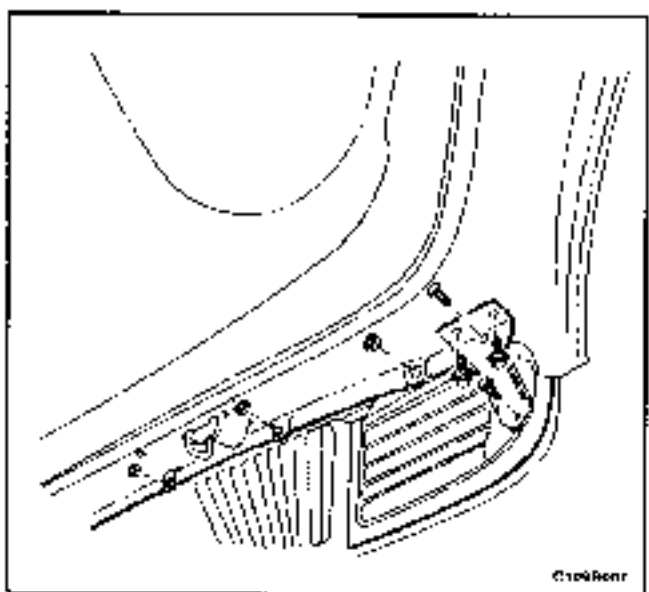
1. Install the hood insulation with the retaining clips.
2. Install the washer hose to the hood
3. Close the hood



## RADIATOR GRILLE

### Removal Procedure

1. Open the hood.
2. Remove the screws, the bolts, and the radiator grille bracket.
3. Remove the nuts and the radiator grille.



### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the radiator grille with the nuts.

#### Tighten

Tighten the radiator grille nuts to 4 N•m (35 lb-in).

2. Install the radiator grille bracket with the screws and the bolts.

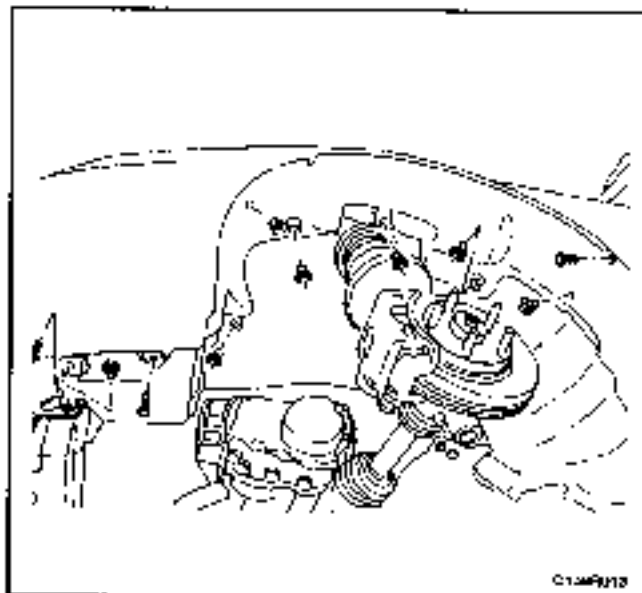
#### Tighten

Tighten the radiator grille screws to 2 N•m (18 lb-in).

#### Tighten

Tighten the radiator grille bracket bolts to 10 N•m (88 lb-in)

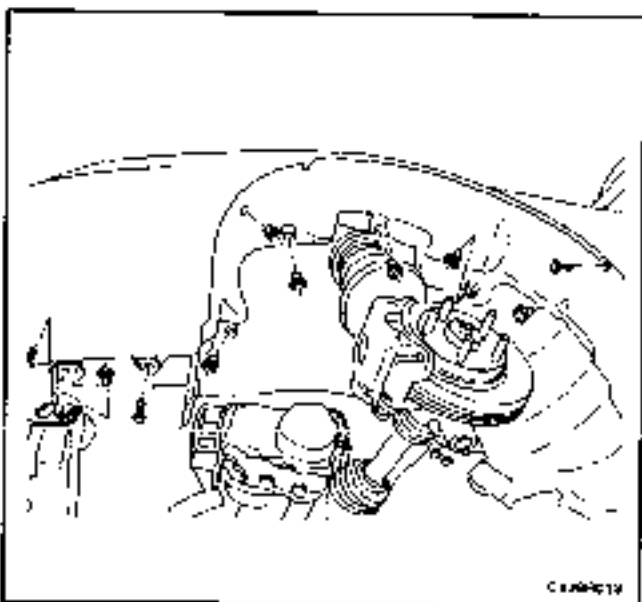
3. Close the hood.



## FRONT WHEEL WELL SPLASH SHIELD

### Removal Procedure

1. Raise and suitably support the vehicle.
2. Remove the front wheel. Refer to Section 2E, *Tires and Wheels*.
3. Remove the front mud guard. Refer to Section 9M, *Exterior Trim*.
4. Remove the screws and the front wheel well splash shield.



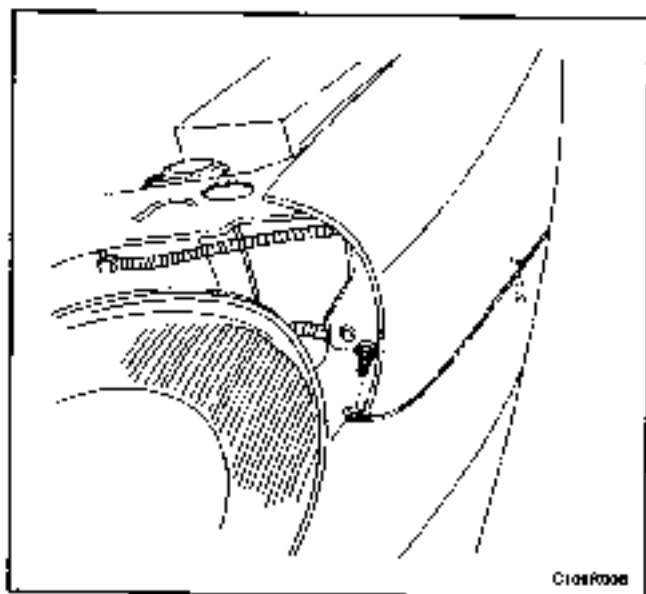
### Installation Procedure

1. Install the screws and the front wheel well splash shield.

### Tighten

Tighten the front wheel well splash shield screws to 2 N·m (16 lb·in).

2. Install the front mud guard. Refer to Section 9M, *Exterior Trim*.
3. Install the front wheel. Refer to Section 2E, *Tires and Wheels*.
4. Lower the vehicle.

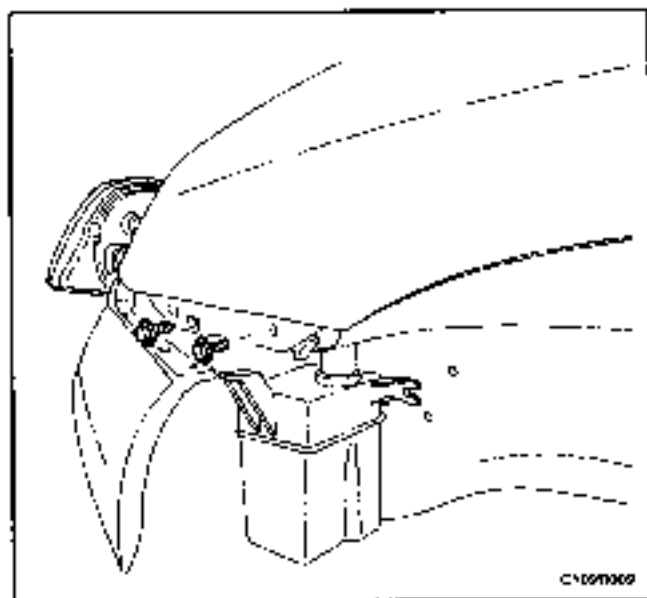


## FENDER

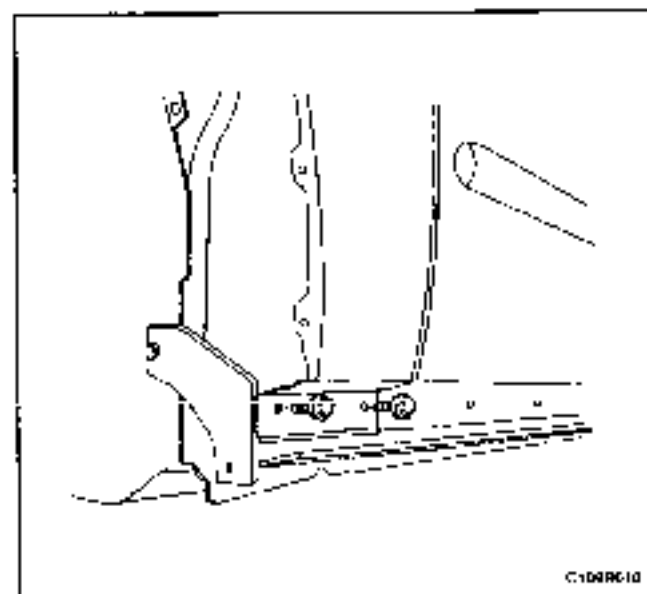
### Removal Procedure

1. Remove the front wheel well splash shield. Refer to "Front Wheel Well Splash Shield" in this section.
2. Reposition the front headlamp.
3. Remove the bolts securing the front fascia to the fender.

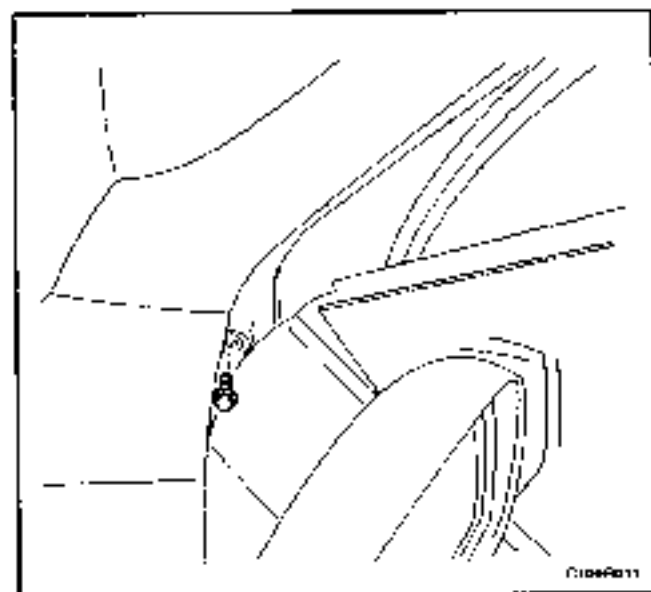
## 9R - 10 BODY FRONT END



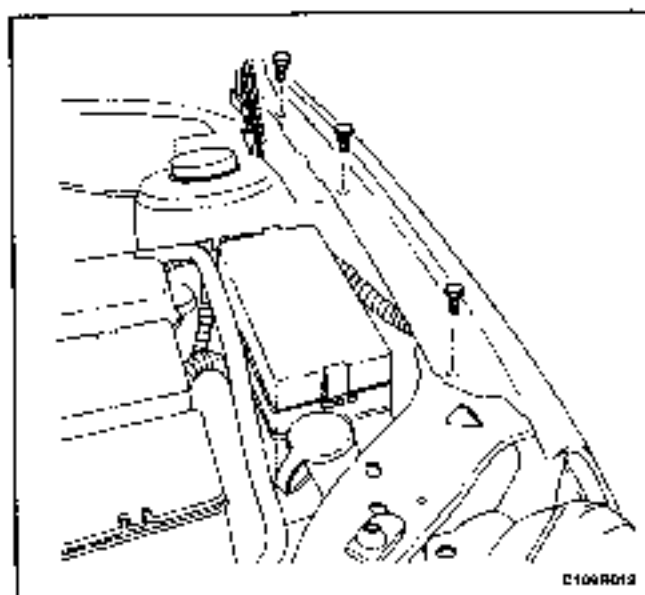
4. Reposition the front fascia.
5. Remove the fender bolts behind the front fascia.



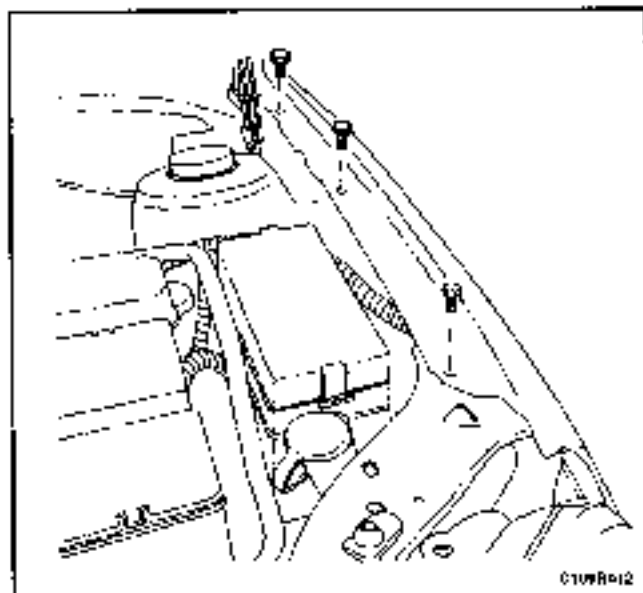
6. Remove the rocker panel molding. Refer to Section 9M, Exterior Trim.
7. Remove the bolts at the base of the fender.



8. Remove the side turn signal lamp. Refer to Section 9B, Lighting Systems.
9. Open the front door and remove the bolt at the base of the A-pillar.



10. Reposition the cowl vent grille weatherstrip.
11. Remove the upper fender bolts and the fender.



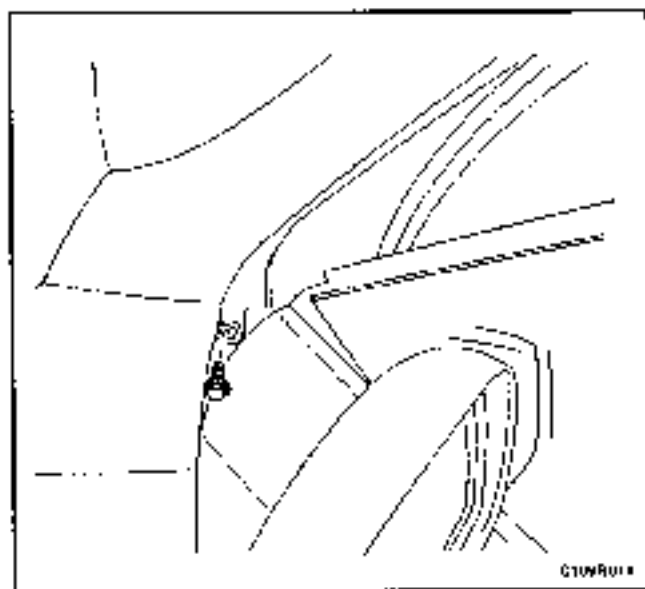
### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the fender with the upper fender bolts.

#### Tighten

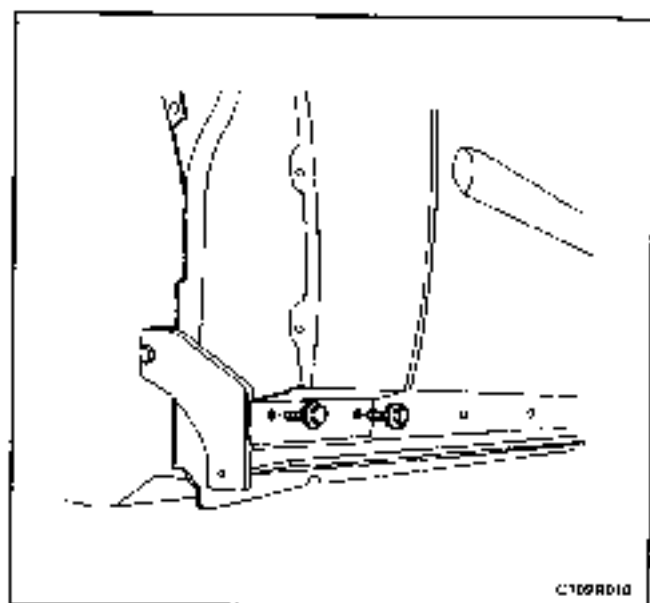
Tighten the upper fender bolts to 10 N·m (89 lbf-in).



2. Reposition the cowl vent grille weatherstrip to its original position.
3. Install the bolt at the base of the A-pillar.

#### Tighten

Tighten the A-pillar fender bolt to 10 N·m (89 lbf-in)

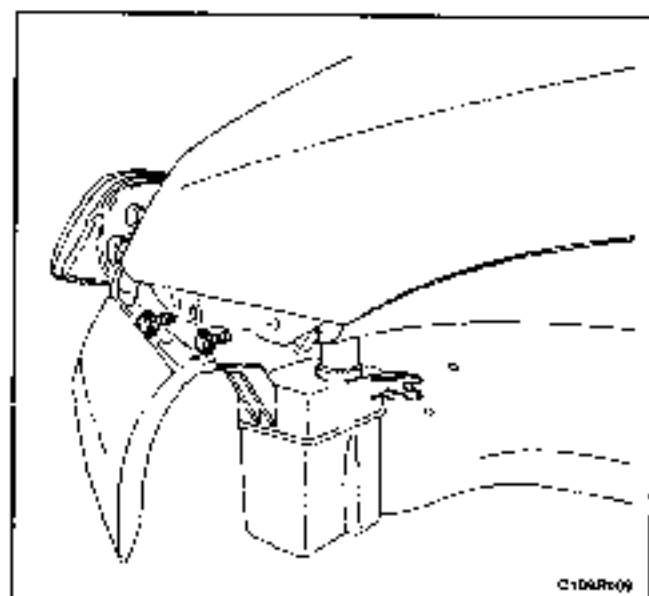


4. Install the side turn signal lamp. Refer to Section 9B, *Lighting Systems*.

5. Install the bolts at the base of the fender.

**Tighten**

Tighten the lower fender bolts to 10 N•m (89 lb-in).

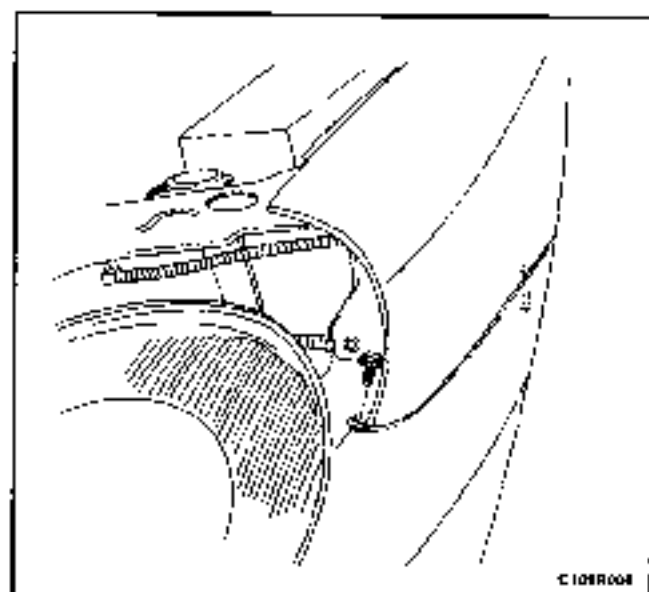


6. Install the rocker panel molding. Refer to Section 9M, *Exterior Trim*.

7. Install the front fender bolts behind the front fascia.

**Tighten**

Tighten the front fender bolts to 10 N•m (89 lb-in).



8. Install the front fascia to its original position.

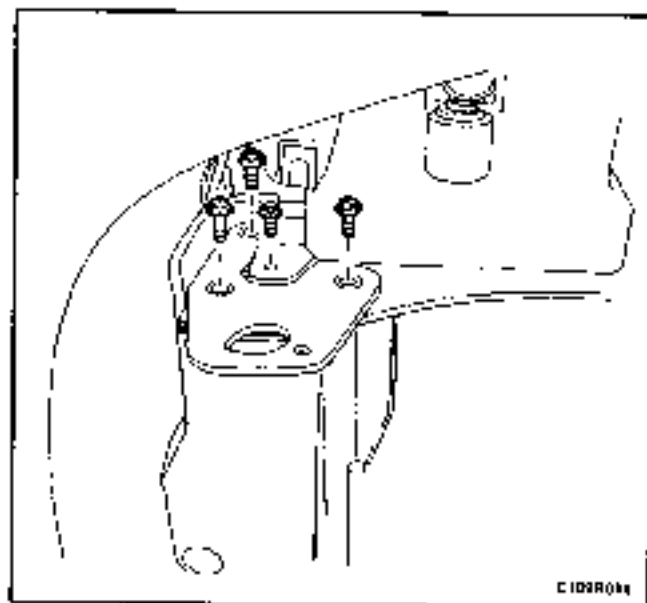
9. Install the bolts securing the front fascia to the fender.

**Tighten**

Tighten the front fascia-to-fender bolts to 2.5 N•m (22 lb-in).

10. Install the front headlamp to its original position.

11. Install the front wheel well splash shield. Refer to "Front Wheel Well Splash Shield" in this section.

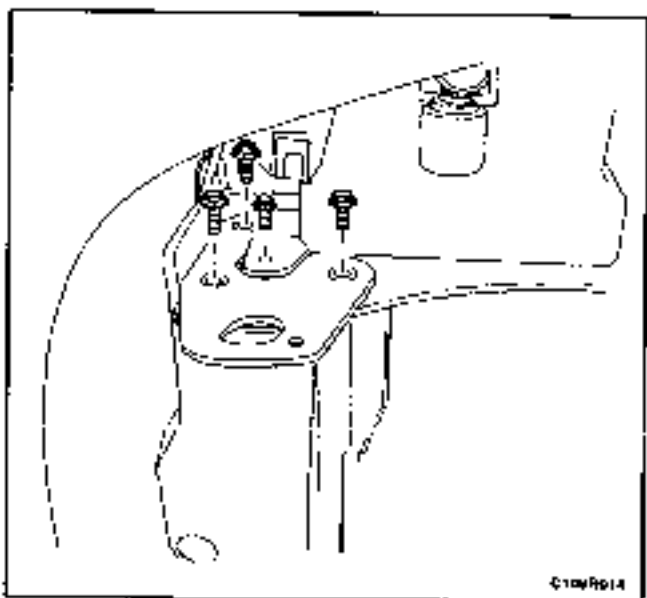


C102R014

## TIEDOWN HOOK

### Removal Procedure

1. Reposition the front portion of the front wheel well splash shield.
2. Remove the front washer reservoir bolt (driver side aft), and the resonator bolt (passenger side).
3. Remove the bolts and the tiedown hook.



C102R014

### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the tiedown hook with the bolts.

#### Tighten

Tighten the tiedown hook bolts to 25 N·m (18 lb-ft).

2. Install the front washer reservoir bolt (driver side aft).

#### Tighten

Tighten the washer reservoir bolt to 9 N·m (80 lb-in).

3. Install the resonator bolt (passenger side).

#### Tighten

Tighten the resonator bolt to 9 N·m (80 lb-in).

4. Install the front wheel well splash shield to its original position.

## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **BODY FRONT END**

This vehicle has a unitized body with a frame assembly supporting the engine and the transaxle. The fender panels and the radiator support are also integral parts of the body.



# SECTION 9S

## BODY REAR END

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Fuel Filler Door Screws	4	-	35
Fuel Filler Door/Rear Deck Lid Remote Cable Handle Cover Screw	3	-	27
Fuel Filler Door/Rear Deck Lid Remote Cable Handle Screws	8	-	71
Lower B-Pillar Seat Belt Anchor Bolt	37	27	-
Luggage Compartment Lock Cylinder Nuts	1.5	-	13
Luggage Compartment Lock Screws	6	-	53
Luggage Compartment Lock Striker Bolts	8	-	71
Rear Deck Lid Bolts	10	-	89
Towing Eye Bolts	25	18	-

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### FUEL FILLER DOOR

##### Removal Procedure

1. Remove the screws and the fuel filler door.

##### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the fuel filler door with the screws.

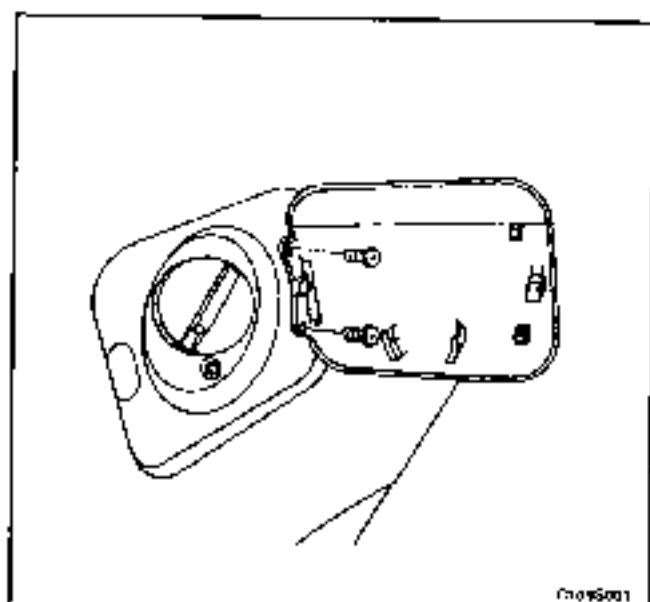
##### Tighten

Tighten the fuel filler door screws to 4 N·m (35 lb-in).

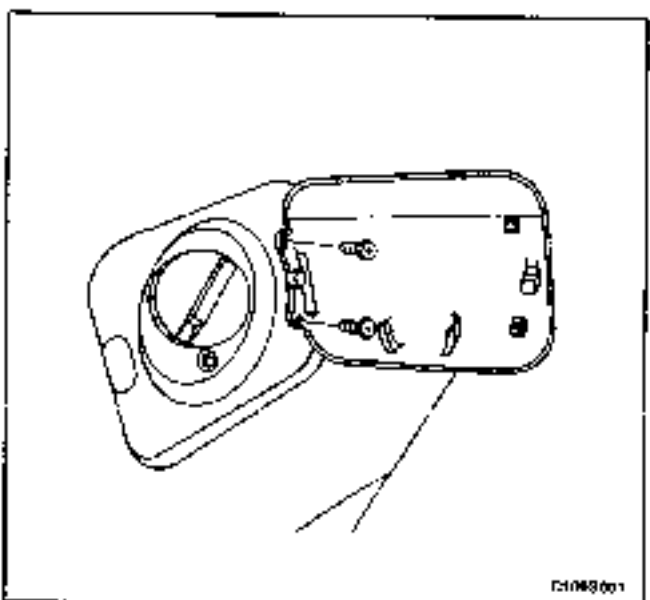
#### REAR DECK LID

##### Removal Procedure

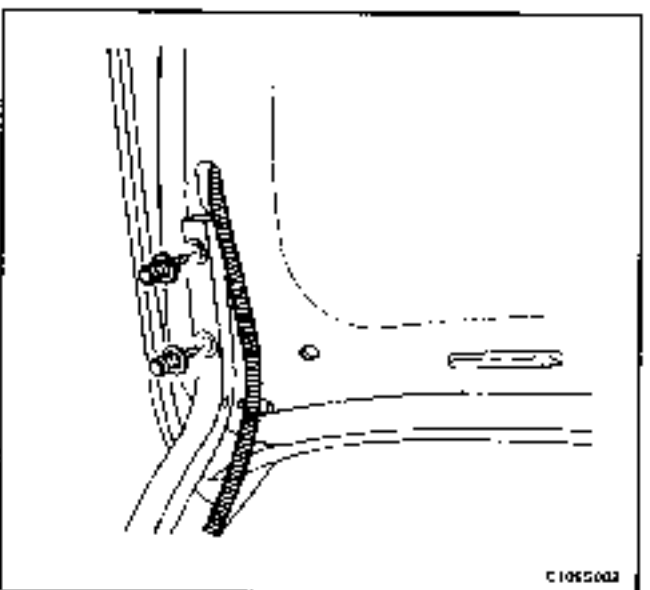
1. Disconnect the negative battery cable.
2. Disconnect the electrical connector.
3. Remove the electrical harness from the rear deck lid hinge arm.
4. Remove the bolts and the rear deck lid.



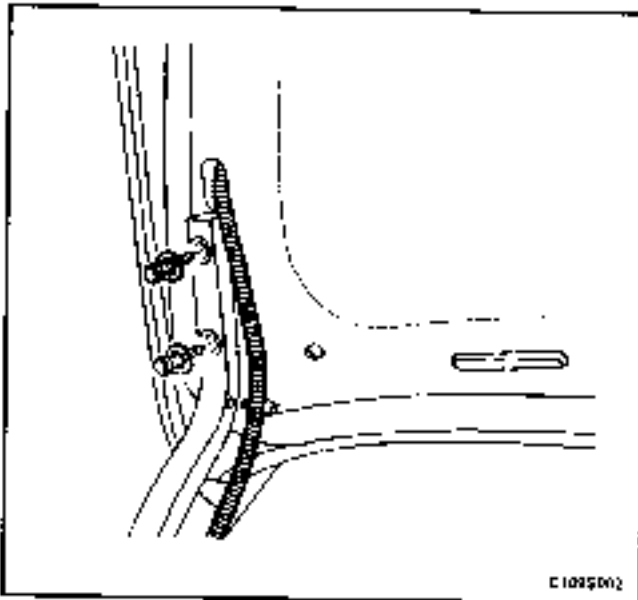
C1045001



C1045001



C1055002



### Installation Procedure

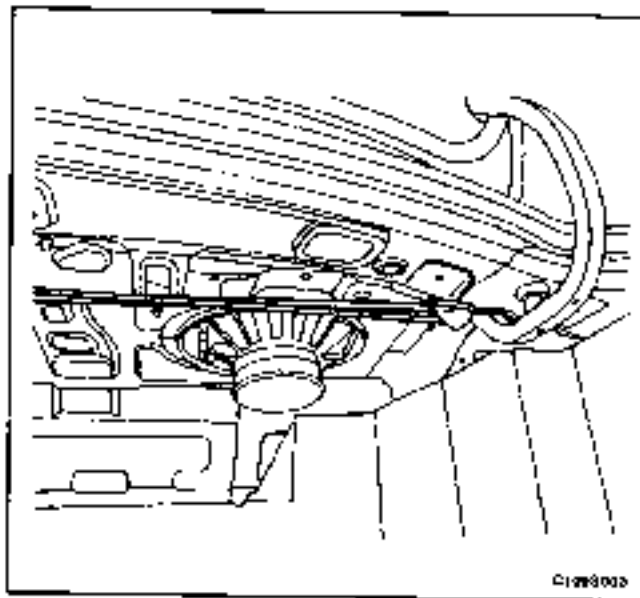
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

1. Install the rear deck lid with the bolts.

### Tighten

Tighten the rear deck lid bolts to 10 N•m (89 lb-in).

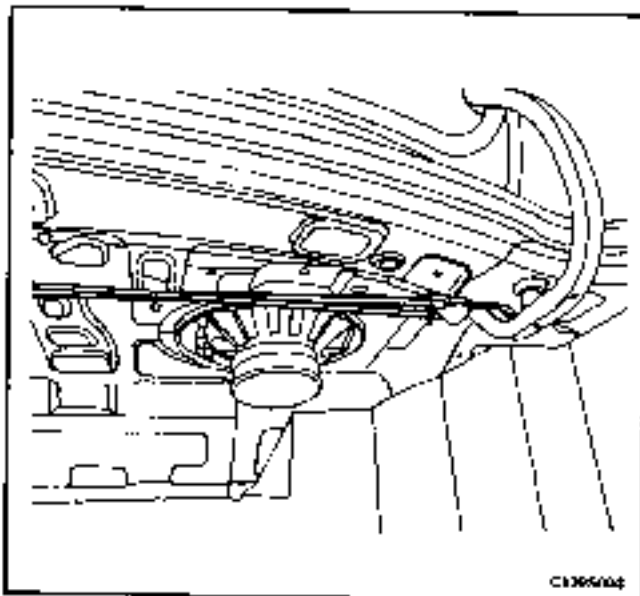
2. Install the electrical harness to the rear deck lid hinge arm.
3. Connect the electrical connector.
4. Connect the negative battery cable.



### REAR DECK LID TORQUE RODS

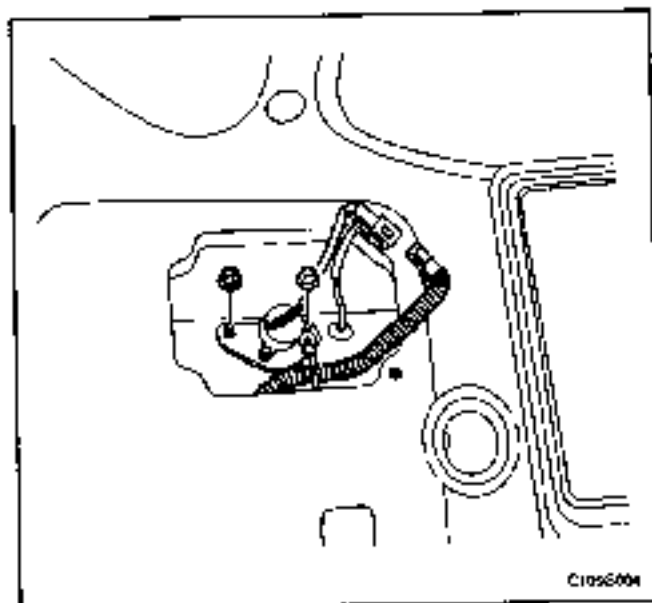
#### Removal Procedure

1. Raise and support the deck lid in the open position.
2. Pull the torque rods out of the rear mount.
3. Remove the torque rods from the hinge.



#### Installation Procedure

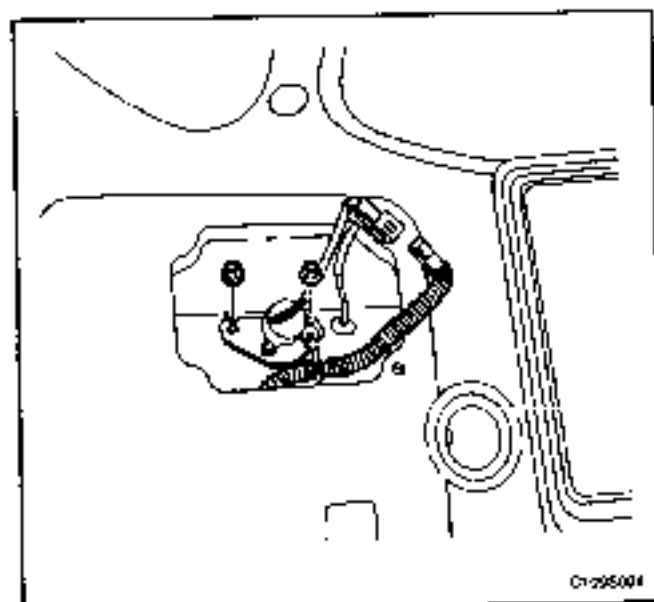
1. Install the torque rods into the hinge mount.
2. Extend the torque rods to mount them in the rear mounting hole.



## LUGGAGE COMPARTMENT LOCK CYLINDER

### Removal Procedure

1. Remove the nuts securing the lock cylinder.
2. Disconnect the lock rod.
3. Disconnect the electrical connector.
4. Remove the luggage compartment lock cylinder.



### Installation Procedure

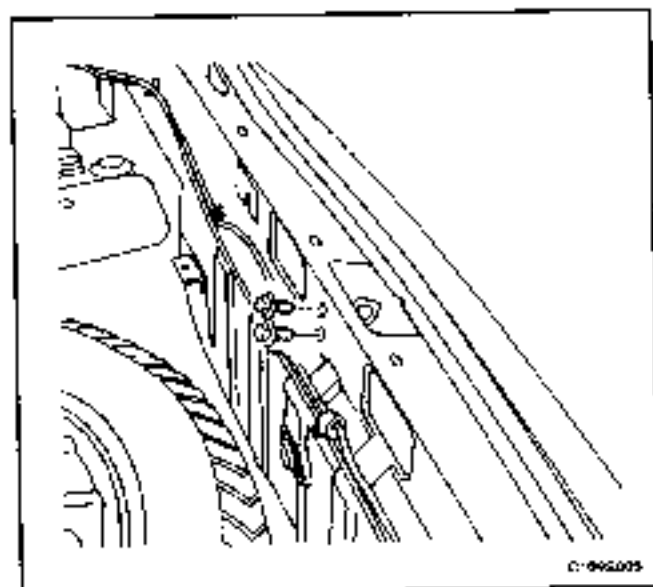
1. Install the luggage compartment lock cylinder.
2. Connect the electrical connector.
3. Connect the lock rod.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

4. Secure the luggage compartment lock cylinder with the nuts.

### Tighten

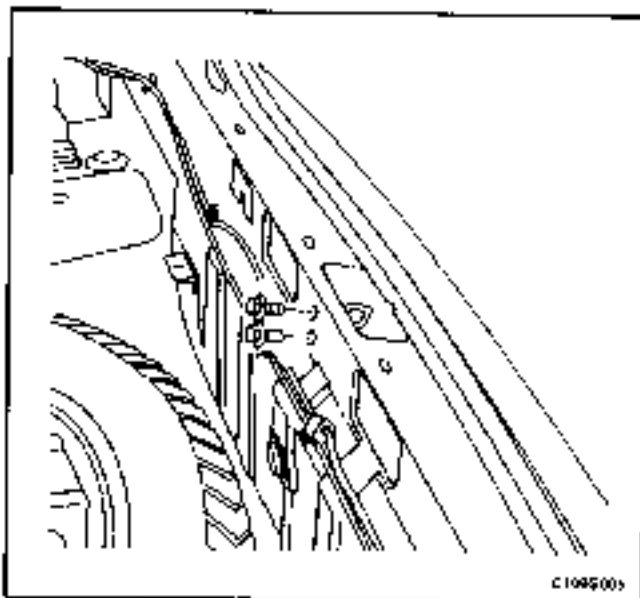
Tighten the luggage compartment lock cylinder nuts to 1.5 N•m (13 lb•in).



## LUGGAGE COMPARTMENT LOCK STRIKER

### Removal Procedure

1. Open the luggage compartment.
2. Remove the luggage compartment rear trim panel. Refer to Section 9G, *Interior Trim*.
3. Remove the bolts securing the lock striker.
4. Pull the lock striker out.
5. Disconnect the lock release cable from the lock striker.



### Installation Procedure

1. Connect the lock release cable.

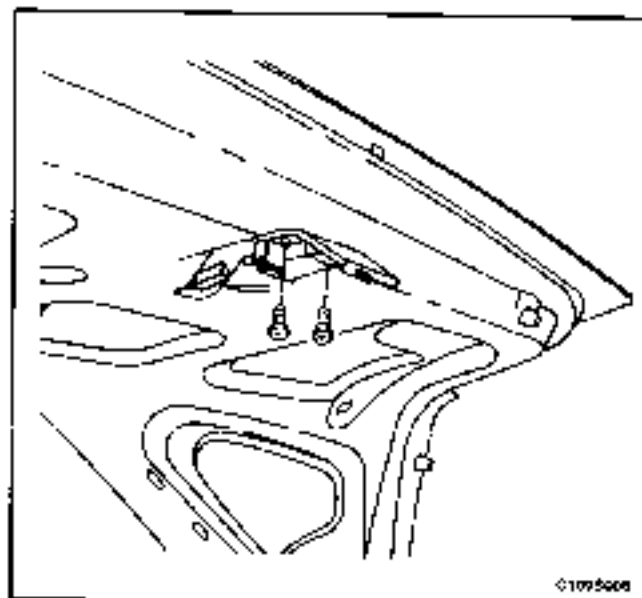
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the lock striker with the bolts.

### Tighten

Tighten the luggage compartment lock striker bolts to 8 N·m (71 lb-in).

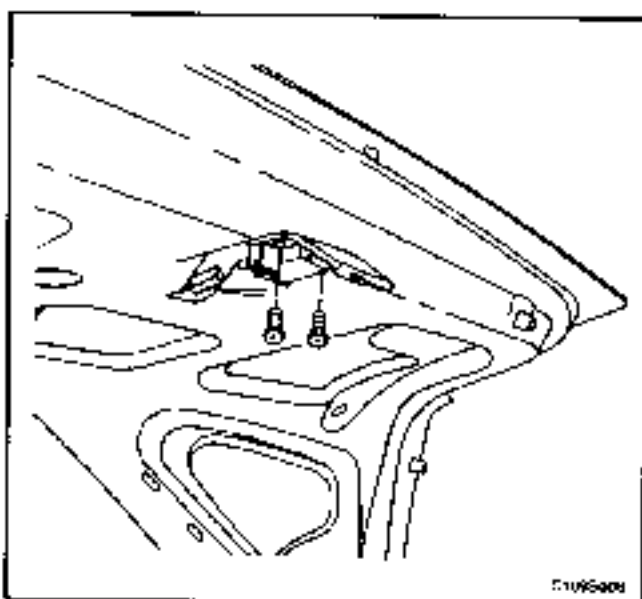
3. Install the luggage compartment rear trim panel. Refer to Section 9G, Interior Trim.



## LUGGAGE COMPARTMENT LOCK

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the luggage compartment lock cover.
3. Disconnect the electrical connector.
4. Remove the screws and the luggage compartment lock.
5. Disconnect the lock rod.



### Installation Procedure

1. Connect the lock rod.

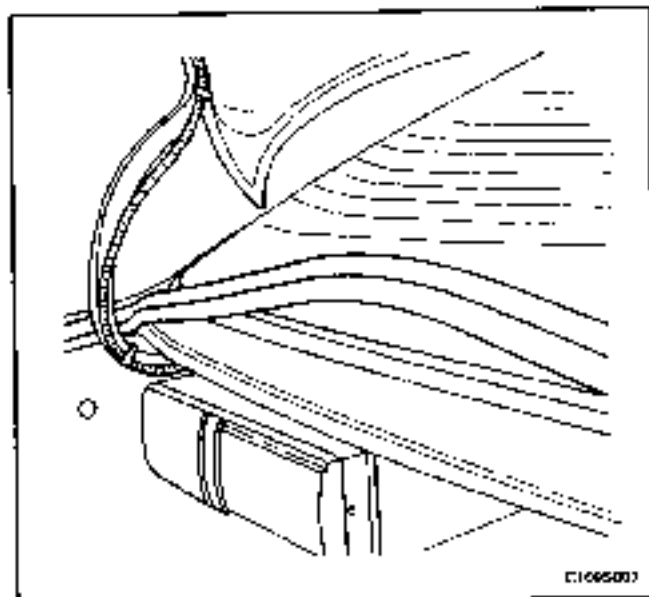
**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

2. Install the luggage compartment lock with the screws.

### Tighten

Tighten the luggage compartment lock screws to 6 N·m (53 lb-in).

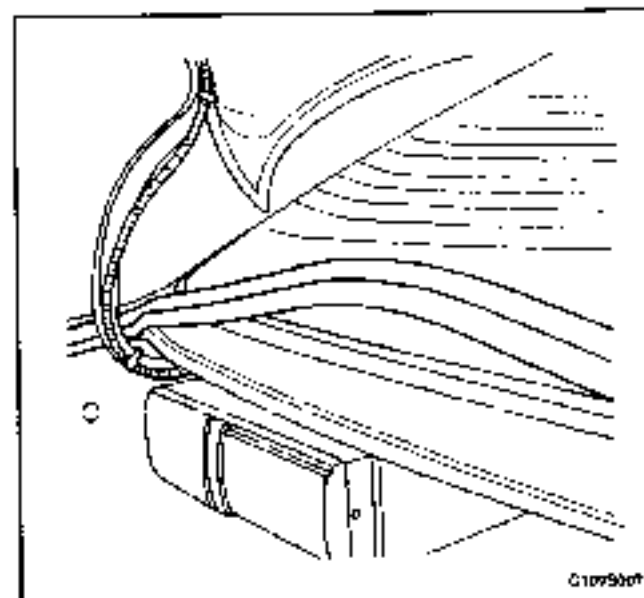
3. Connect the electrical connector.
4. Install the luggage compartment lock cover.
5. Connect the negative battery cable.



## WEATHERSTRIP

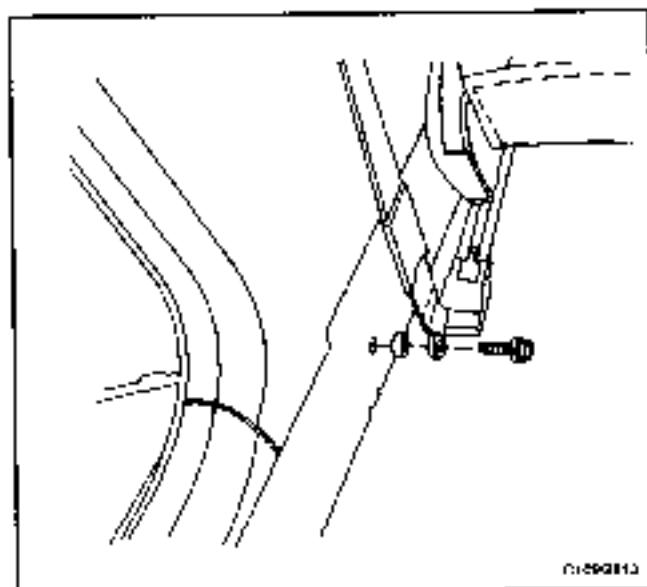
### Removal Procedure

1. Open the luggage compartment lid.
2. Remove the weatherstrip from around the gutter.



### Installation Procedure

1. Install the weatherstrip onto the gutter flange.
2. Inspect the weatherstrip. Make sure that the c-inch is completely seated onto the flange.
3. Using a water hose without a nozzle, test the rear deck lid to make sure that no leaks are present.
  - If there are no leaks present, no further repair is required.
  - If leaks are present, continue with the remainder of the installation procedure.
4. Remove the weatherstrip.
5. Install the new weatherstrip onto the gutter flange.

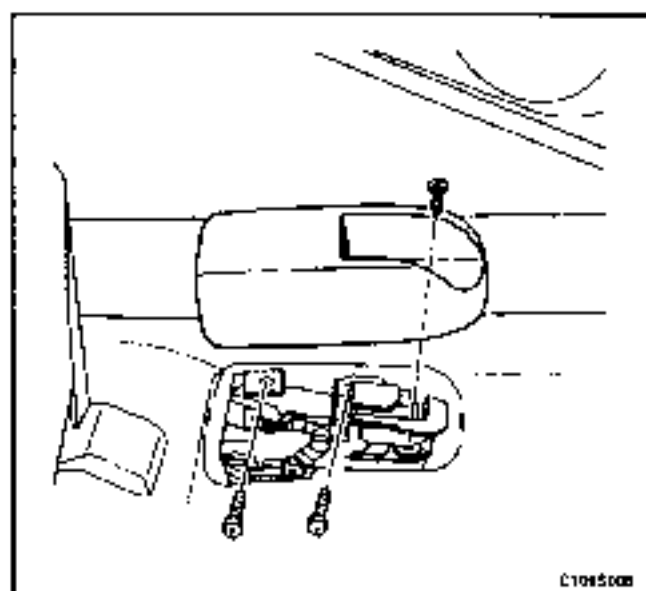


## REAR DECK LID REMOTE HANDLE AND CABLE

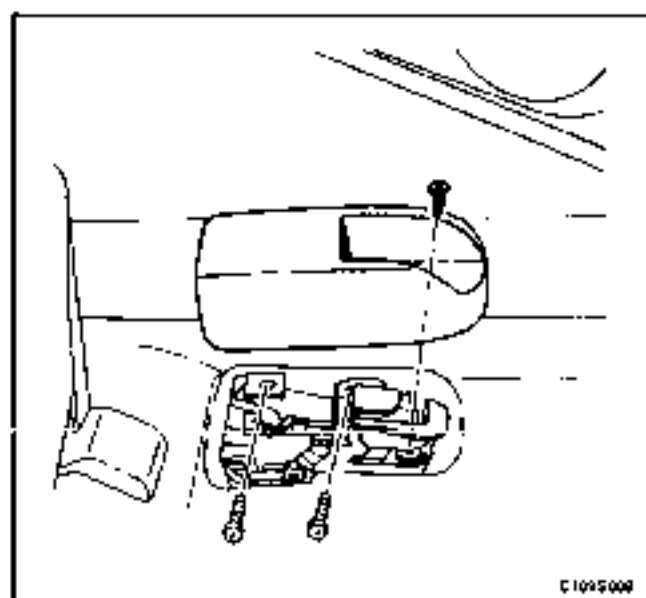
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Open the luggage compartment.
2. Remove the luggage compartment left side wheelhouse trim panel and the luggage compartment rear trim panel. Refer to Section 9G, Interior Trim.
3. Remove the lock striker. Refer to "Luggage Compartment Lock Striker" in this section.
4. Remove the lower B-pillar seal hell bolt and the anchor.



C1045000



C1045000

5. Remove the screw and the fuel filler door/rear deck lid remote cable handle cover.
6. Remove the screws and the fuel filler door/rear deck lid remote cable handle.
7. Disconnect the cable from the handle.
8. Remove the driver's seat and the rear seats. Refer to *Section 9H, Seats*.
9. Remove the left side front and rear rocker panels, the left side kick panel, and the left side lower B-pillar trim panel. Refer to *Section 9G, Interior Trim*.
10. Reposition the floor carpet on the left side of the vehicle.
11. Remove the cable.

### Installation Procedure

1. Feed the cable from the luggage compartment to the passenger compartment.
2. Install the floor carpet to its original position.
3. Install the left side front and rear rocker panels, the left side kick panel, and the left side lower B-pillar trim panel. Refer to *Section 9G, Interior Trim*.
4. Install the driver's seat and the rear seats. Refer to *Section 9H, Seats*.
5. Connect the cable to the handle.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

6. Install the fuel filler door/rear deck lid remote cable handle with the screws.

### Tighten

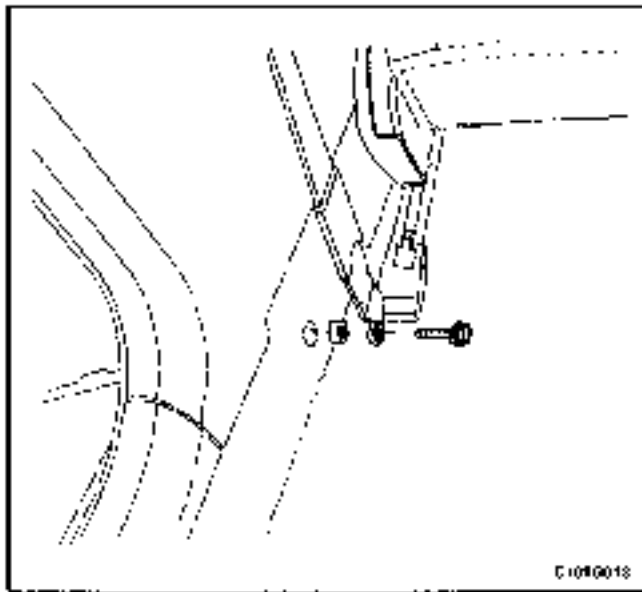
Tighten the fuel filler door/rear deck lid remote cable handle screws to 8 N•m (71 lb-in).

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

7. Install the fuel filler door/rear deck lid remote cable handle cover with the screw.

### Tighten

Tighten the fuel filler door/rear deck lid remote cable handle cover screw to 3 N•m (27 lb-in).

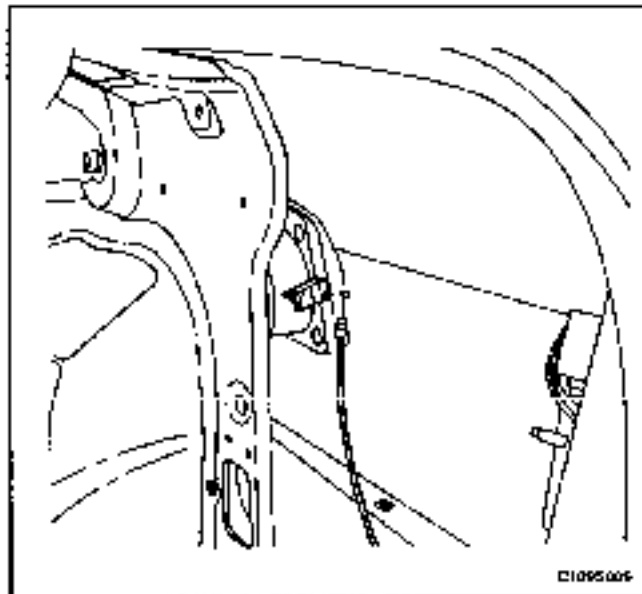


8. Install the lower B-pillar seat belt anchor with the bolt.

**Tighten**

Tighten the lower B-pillar seat belt bolt to 37 N·m (27 lb-ft).

9. Install the lock striker. Refer to "Luggage Compartment Lock Striker" in this section.
10. Install the luggage compartment left side wheelhouse trim panels and the luggage compartment rear trim panel. Refer to Section 9G, Interior Trim.
11. Close the luggage compartment.

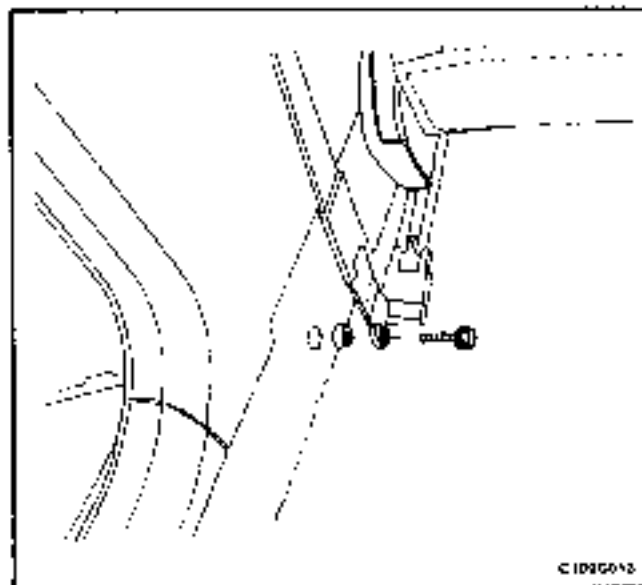


**FUEL FILLER DOOR REMOTE HANDLE AND CABLE**

(Left-Hand Drive Shown, Right-Hand Drive Similar)

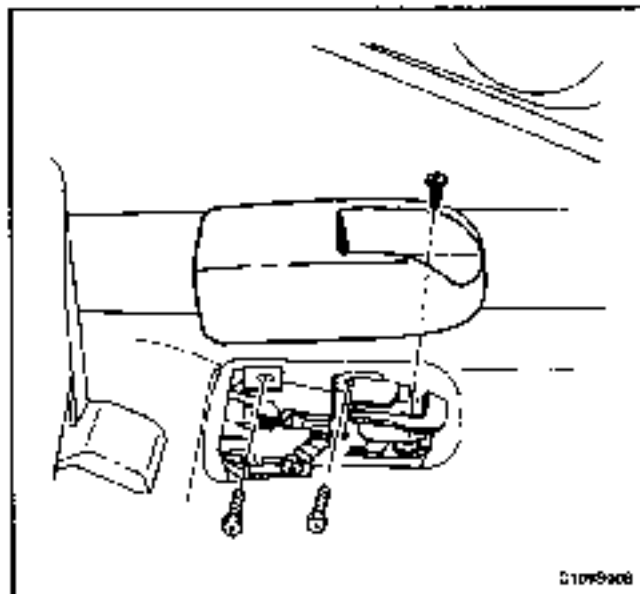
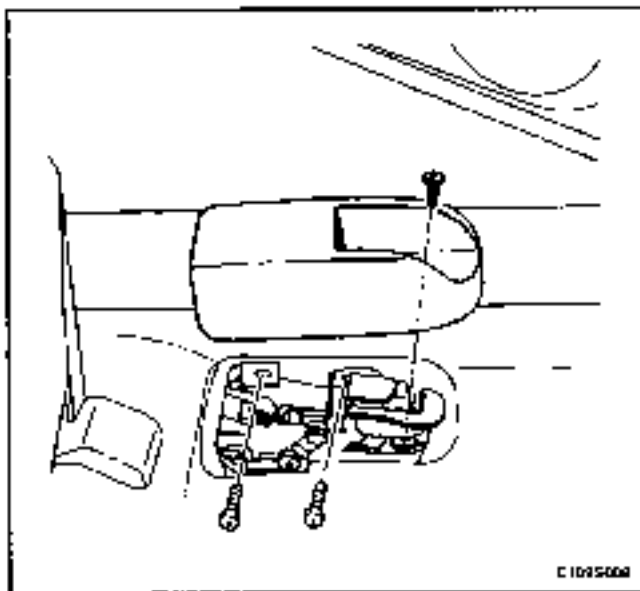
**Removal Procedure**

1. Open the luggage compartment.
2. Remove the luggage compartment wheelhouse trim panels and the luggage compartment rear trim panel. Refer to Section 9G, Interior Trim.
3. Disconnect the cable from the fuel filler door.



4. Remove the lower B-pillar seat belt bolt and the anchor.





5. Remove the screw and the fuel filler door/rear deck lid remote cable handle cover.
6. Remove the screws and the fuel filler door/rear deck lid remote cable handle.
7. Disconnect the cable from the handle.
8. Remove the driver's seat and the rear seats. Refer to Section 9H, Seats.
9. Remove the left side front and rear rocker panels, the left side kick panel, and the left side lower B-pillar trim panel. Refer to Section 9G, Interior Trim.
10. Reposition the floor carpet on the left side of the vehicle.
11. Remove the cable.

### Installation Procedure

1. Feed the cable from the luggage compartment to the passenger compartment.
2. Install the floor carpet to its original position.
3. Install the left side front and rear rocker panels, the left side kick panel, and the left side lower B-pillar trim panel. Refer to Section 9G, Interior Trim.
4. Install the driver's seat and the rear seats. Refer to Section 9H, Seats.
5. Connect the cable to the handle.

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

6. Install the fuel filler door/rear deck lid remote cable handle with the screws.

### Tighten

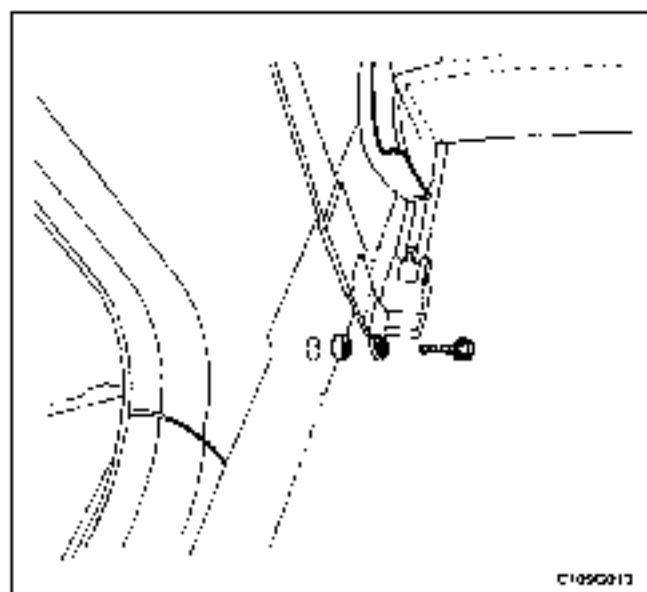
Tighten the fuel filler door/rear deck lid remote cable handle screws to 8 N·m (71 lb-in).

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

7. Install the fuel filler door/rear deck lid remote cable handle cover with the screw.

### Tighten

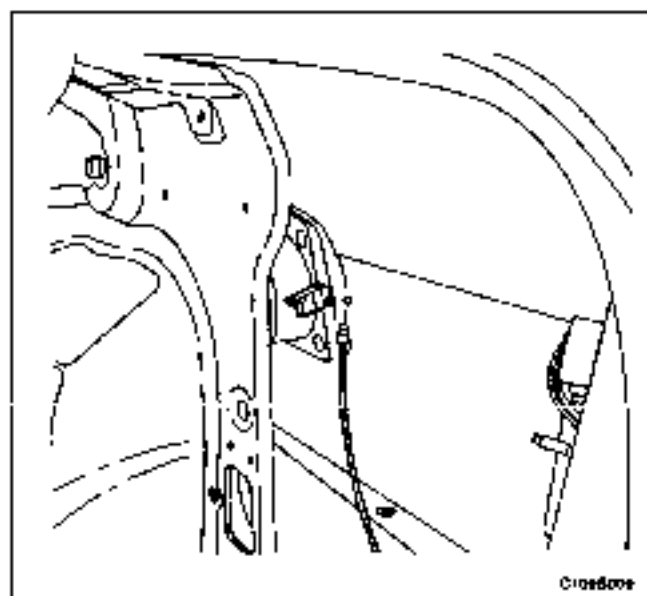
Tighten the fuel filler door/rear deck lid remote cable handle cover screw to 3 N·m (27 lb-in).



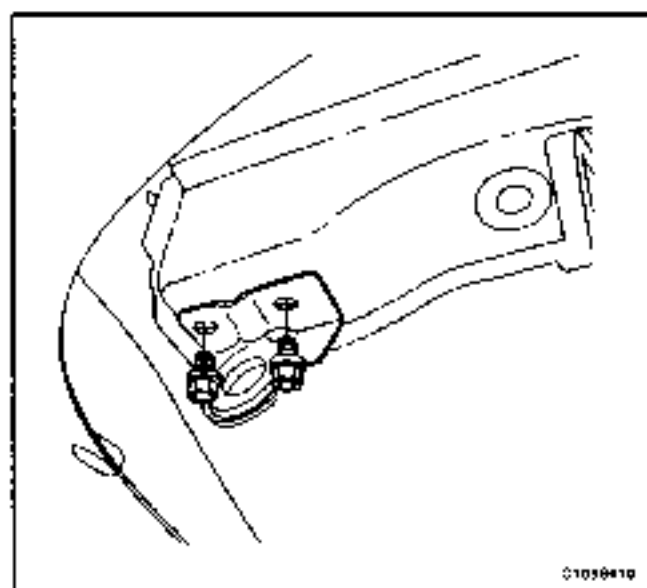
8. Install the lower B-pillar seat belt anchor with the bolt.

**Tighten**

Tighten the lower B-pillar seat belt anchor bolt to 37 N•m (27 lb ft).



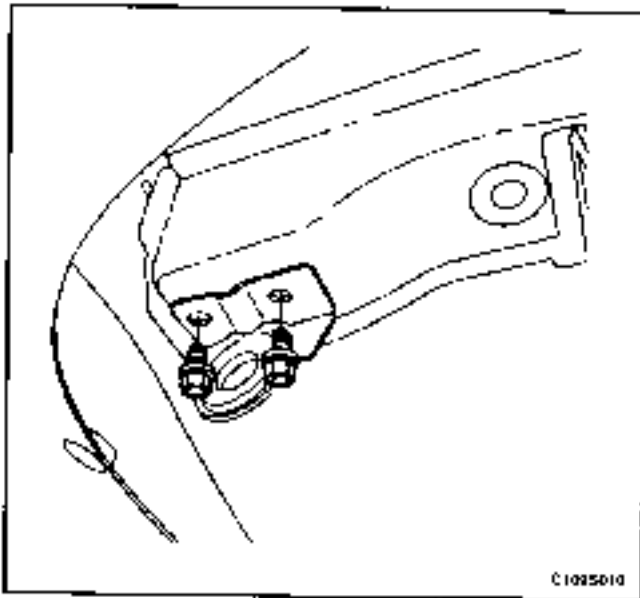
9. Connect the cable to the fuel filler door.  
 10. Install the luggage compartment wheelhouse trim panels and the luggage compartment rear trim panel. Refer to Section 9G, *Interior Trim*.  
 11. Close the luggage compartment.



**TIEDOWN HOOK**

**Removal Procedure**

1. Remove the bolts and the tiedown hook.



### Installation Procedure

**Notice:** Dissimilar metals in direct contact with each other may corrode rapidly. Make sure to use the correct fasteners to prevent premature corrosion.

- 1 Install the tiedown hook with the bolts.

### Tighten

Tighten the tiedown hook bolts to 25 N•m (18 lb-ft).

## **GENERAL DESCRIPTION AND SYSTEM OPERATION**

### **FUEL FILLER DOOR**

The fuel filler door attaches to the fuel tank pocket on the right side of the vehicle. The door is opened by pulling on the fuel filler door remote handle located on the floor in front of the driver's seat.

### **REAR DECK LID**

The rear deck lid consists of an inner and outer panel that is hemmed around the perimeter and bonded together with structural adhesive. The deck lid torque rods assist in the opening of the rear deck lid and hold it in the open position.

## SECTION 9T

# REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM

## REMOTE KEYLESS ENTRY AND PERIMETER/ULTRASONIC ANTI-THEFT SYSTEM

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## SECTION 9T

# REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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<b>Specifications</b> .....	<b>9T-1</b>	Rear Deck Lid Open Switch .....	9T-7
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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Hood Open Switch Mounting Bolt	4	-	35
Siren Bracket Mounting Bolt	11	-	97
Siren Mounting Screws	3	-	27

## SPECIAL TOOLS

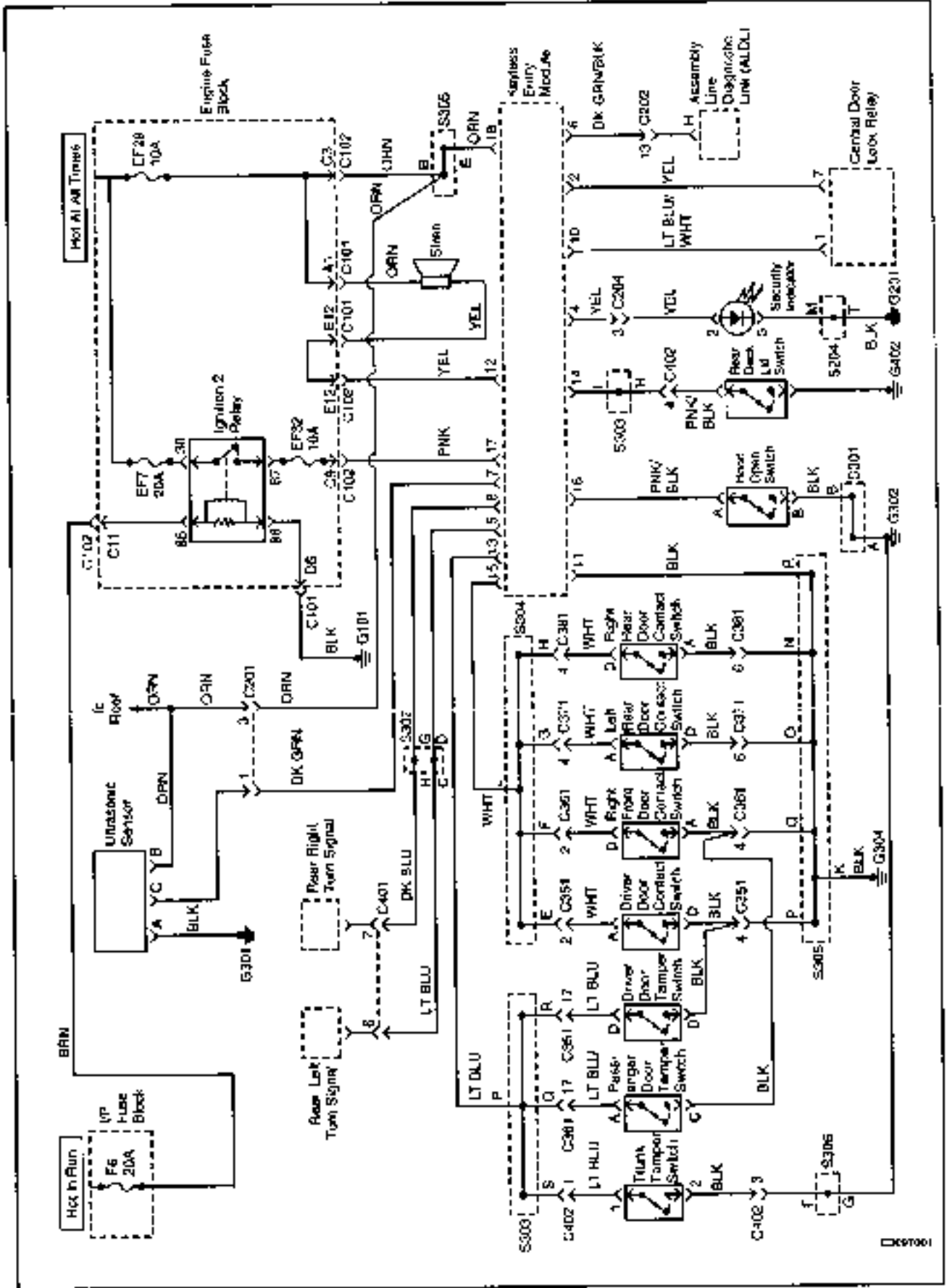
### SPECIAL TOOLS TABLE

 <p>AT 08503</p>	<p>Scan Tool</p>
--	------------------

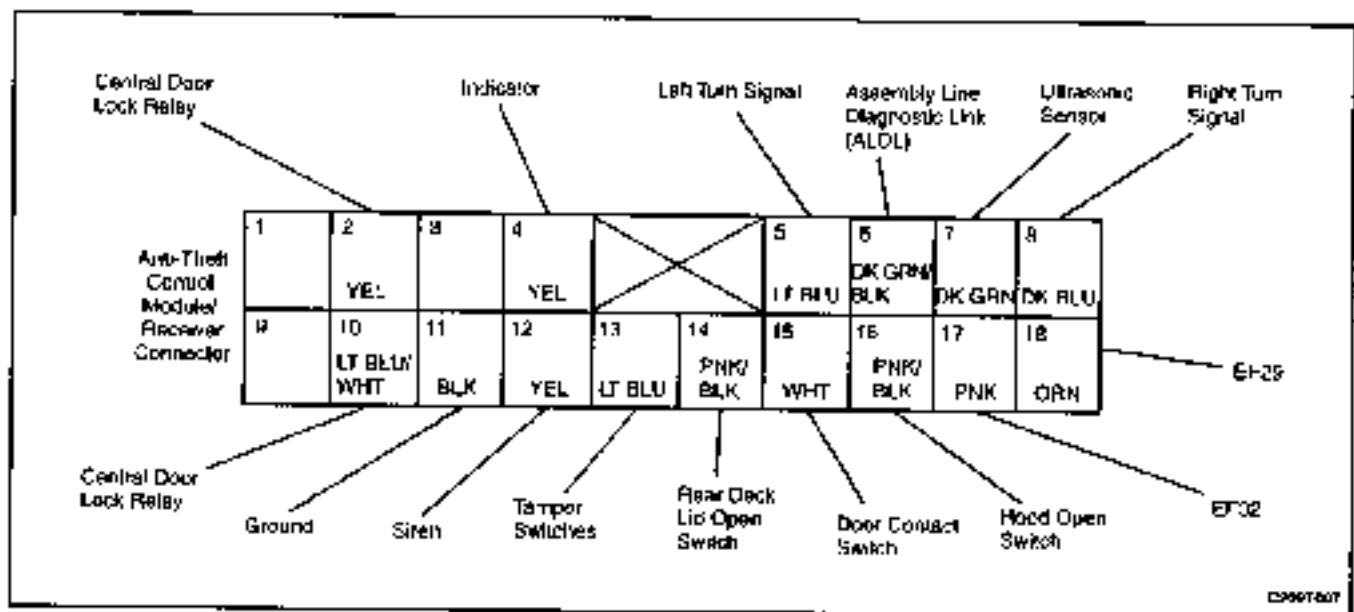


**SCHEMATIC AND ROUTING DIAGRAMS**

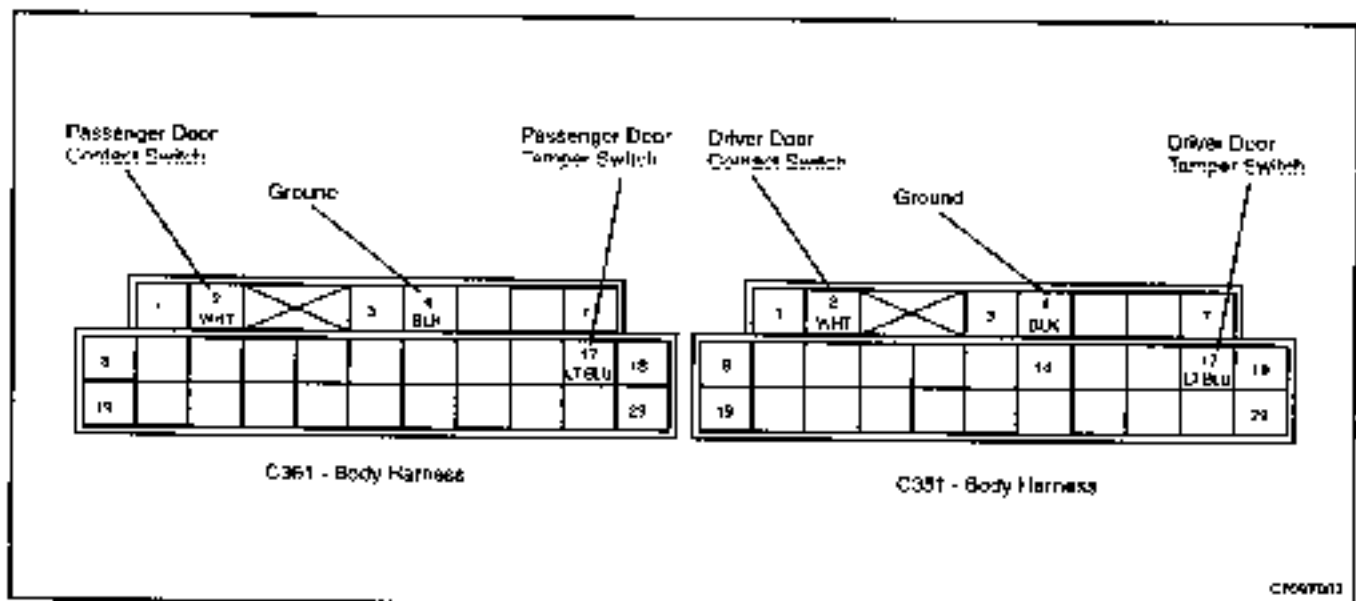
**REMOTE KEYLESS ENTRY AND ANTI-THEFT SYSTEM**

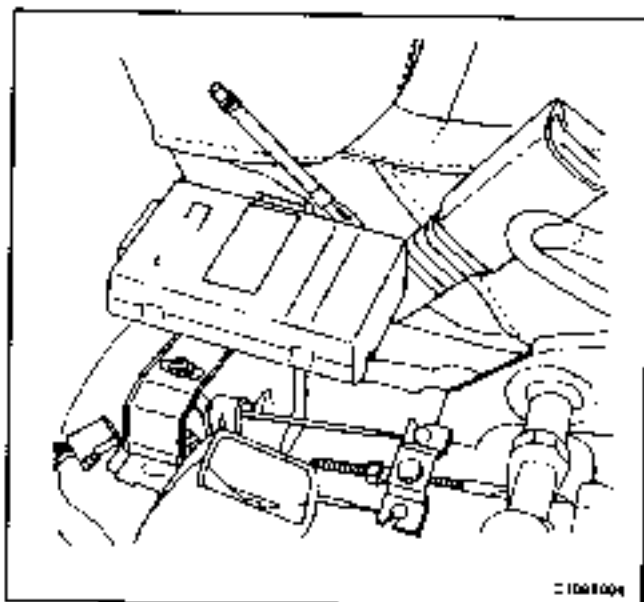


### MODULE/RECEIVER CONNECTOR



### WIRING HARNESS CONNECTORS





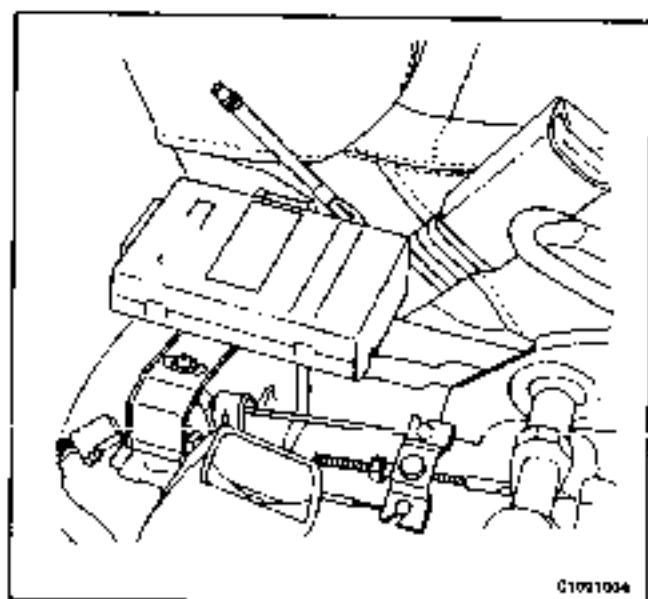
## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### MODULE/RECEIVER

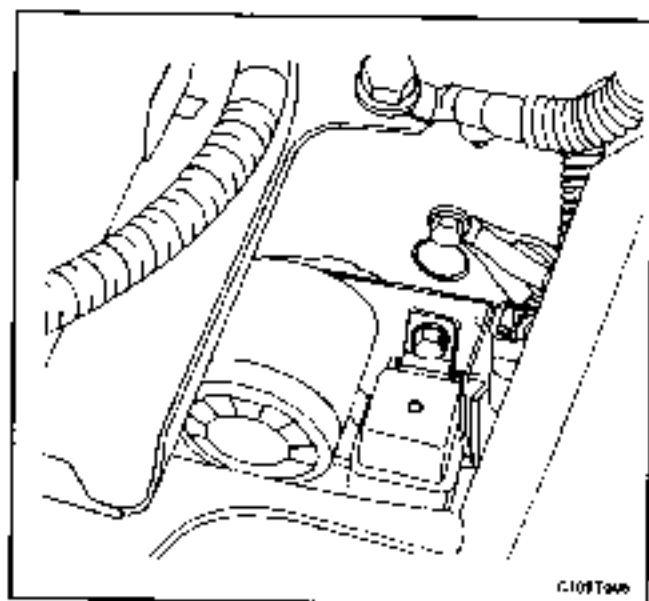
##### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the floor console. Refer to Section 9G, Interior Trim.
3. Disconnect the module/receiver electrical connector.
4. Remove the module/receiver by sliding it toward the front of the vehicle until it disengages from its mounting bracket.



##### Installation Procedure

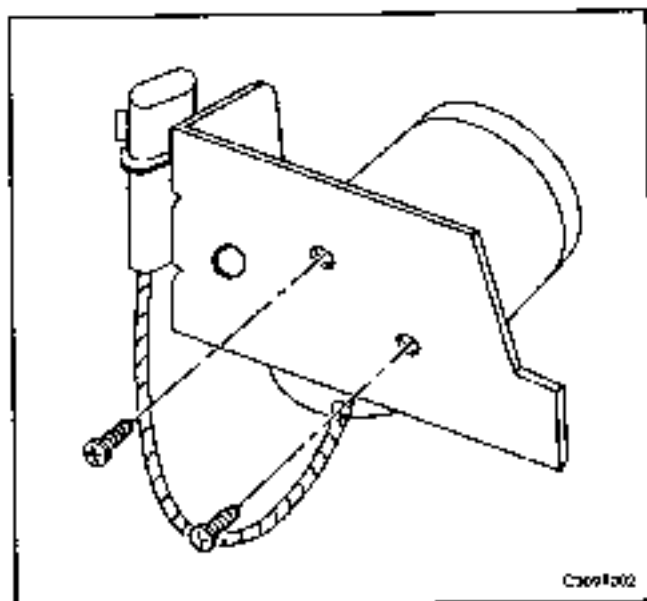
1. Install the module/receiver by sliding it on to its mounting bracket and pushing it toward the rear of the vehicle until it is secure.
2. Connect the module/receiver electrical connector.
3. Install the floor console. Refer to Section 9G, Interior Trim.
4. Connect the negative battery cable.



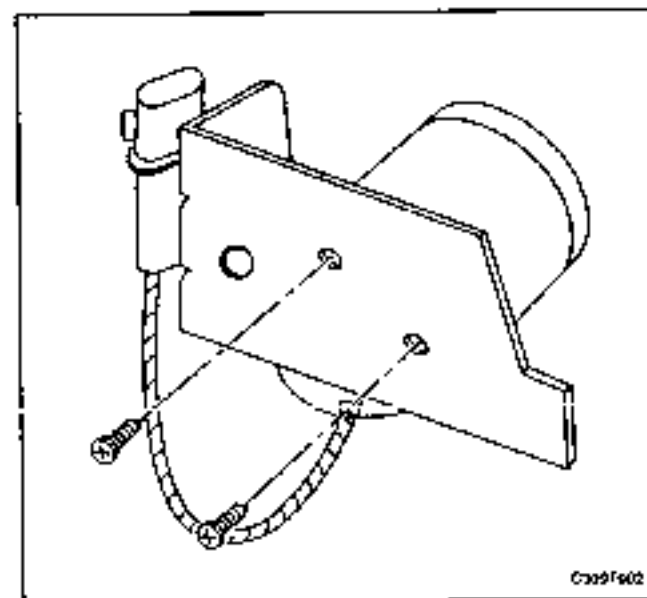
#### SIREN

##### Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the siren electrical connector.
3. Remove the siren bracket mounting bolt.



4. Remove the siren bracket.
5. Remove the siren mounting screws.
6. Remove the siren.

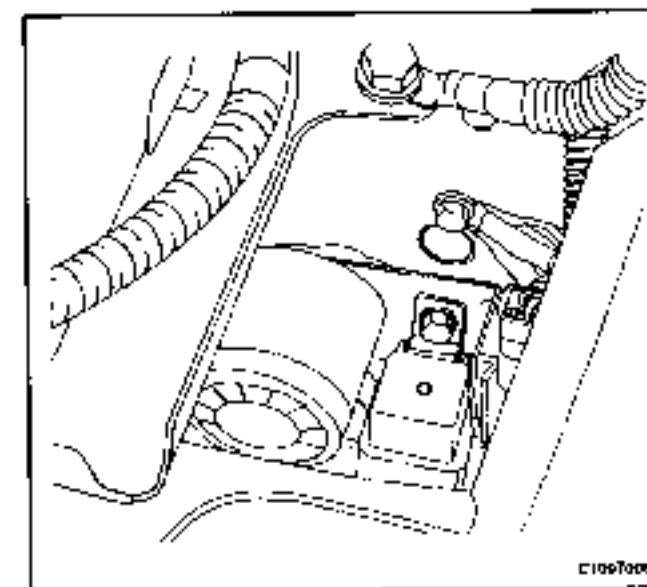


### Installation Procedure

1. Install the siren on the siren bracket with the mounting screws.

#### Tighten

Tighten the siren mounting screws to 3 N•m (27 lb-in).



2. Install the siren bracket with the mounting bolt. Make sure that the siren bracket mounting bolt also fastens the auxiliary fan relay.

#### Tighten

Tighten the siren bracket mounting bolt to 11 N•m (97 lb-in).

3. Connect the siren electrical connector.
4. Connect the negative battery cable.

## **FRONT DOOR TAMPER AND DOOR CONTACT SWITCHES**

### **Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the front door trim panel. Refer to *Section 9G, Interior Trim*.
3. Remove the front door lock with the integral door tamper and door contact switches. Refer to *Section 9P, Doors*.

### **Installation Procedure**

1. Install the front door lock with the integral door tamper and door contact switches. Refer to *Section 9P, Doors*.
2. Install the front door trim panel. Refer to *Section 9G, Interior Trim*.
3. Connect the negative battery cable.

## **REAR DECK LID TAMPER SWITCH**

### **Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the deck lid lock cylinder and integral rear deck lid tamper switch. Refer to *Section 9S, Body Rear End*.

### **Installation Procedure**

1. Install the deck lid lock cylinder and integral rear deck lid tamper switch. Refer to *Section 9S, Body Rear End*.
2. Connect the negative battery cable.

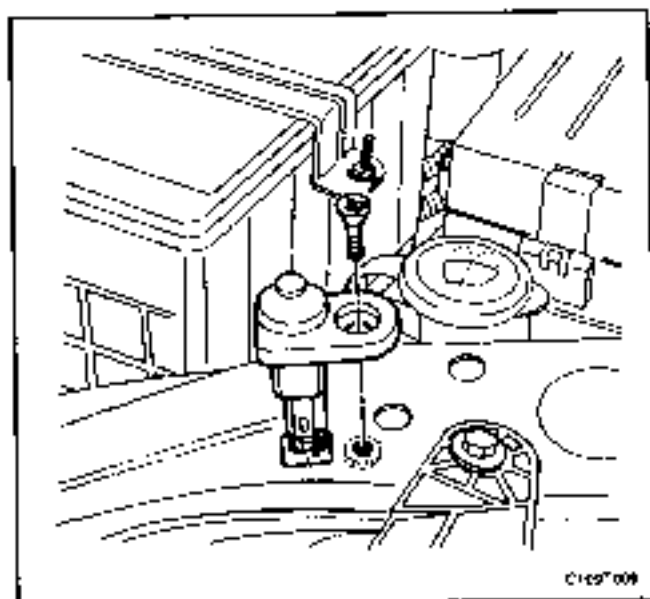
## **REAR DECK LID OPEN SWITCH**

### **Removal Procedure**

1. Disconnect the negative battery cable.
2. Remove the rear deck lid lock and integral rear deck lid open switch. Refer to *Section 9S, Body Rear End*.

### **Installation Procedure**

1. Install the deck lid lock and integral rear deck lid open switch. Refer to *Section 9S, Body Rear End*.
2. Connect the negative battery cable.



## HOOD OPEN SWITCH

### Removal Procedure

1. Disconnect the negative battery cable.
2. Reach underneath the hood open switch and hold the mounting nut while removing the hood open mounting bolt.
3. After the mounting bolt and nut are removed, push the hood open switch upward from below.
4. Disconnect the electrical connector from the hood open switch.
5. Remove the hood open switch.

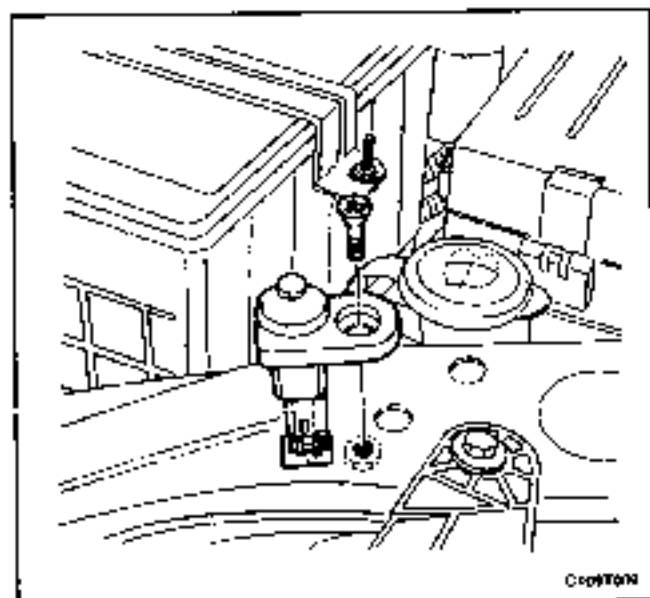
### Installation Procedure

1. Install the hood open switch with the mounting bolt and nut.

#### Tighten

Tighten the hood open switch mounting bolt to 4 N·m (35 lb-in).

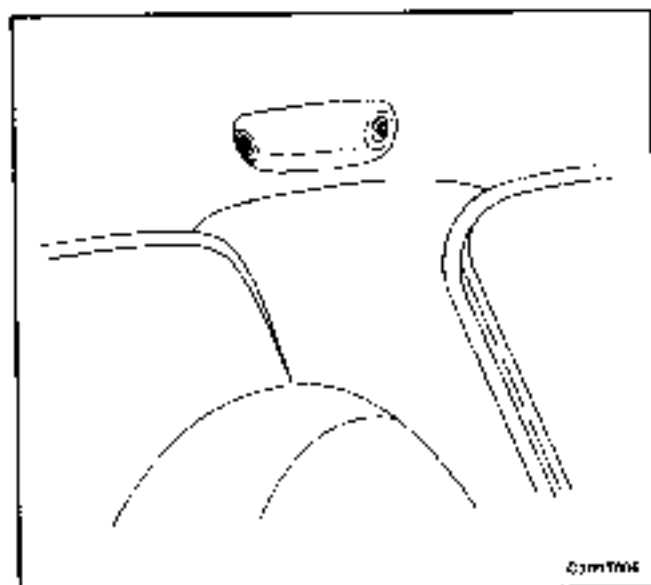
2. Connect the electrical connector to the hood open switch.
3. Connect the negative battery cable.

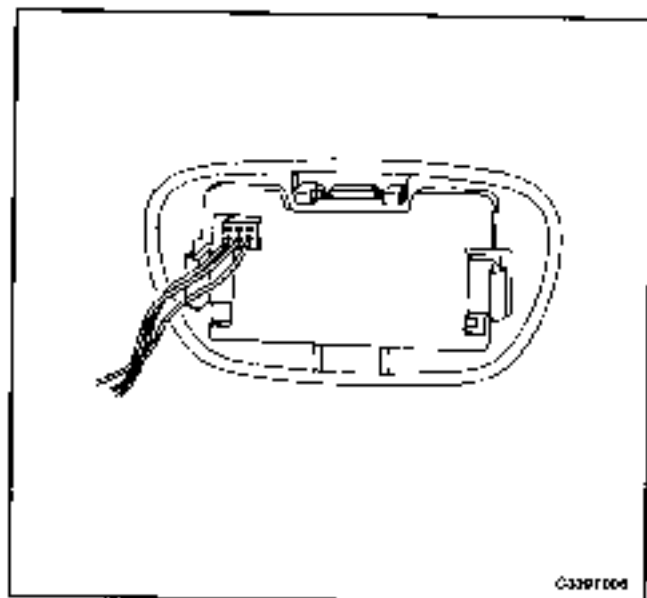


## ULTRASONIC SENSOR

### Removal Procedure

1. Slide the ultrasonic sensor in a sideways direction to loosen the retaining clip while simultaneously pulling the sensor away from the B-pillar.
2. Disconnect the electrical connector from the ultrasonic sensor.





### Installation Procedure

1. Connect the electrical connector to the ultrasonic sensor.
2. Install the ultrasonic sensor by pushing it into the opening in the B-pillar unit. The retaining clips lock into place.

### PASSWORD PROGRAMMING

If a transmitter is lost or damaged, the module/receiver must be reprogrammed to communicate with a new transmitter. The passwords recorded in the module/receiver should not be deleted when power is off in the module/receiver.

Each module/receiver should be able to record five passwords. The following method is used to record new passwords in the module/receiver.

1. Connect the scan tool to the assembly line diagnostic link (ALDL) connector.
2. Turn the ignition ON.
3. Send the programming mode message to the module/receiver.
4. Press three times any button on the transmitter to generate a data code including a password which will be recorded by the module/receiver. The module/receiver sends a response message to the scan tool to indicate that the first password has been recorded.
5. Repeat step 4 until the module/receiver has responded that the second, third, fourth, and fifth passwords have been recorded.
6. Turn the ignition OFF.
7. Disconnect the scan tool.

The module/receiver will exit the programming mode and switch to the normal operating mode when either of the following conditions occurs:

- The scan tool is disconnected from the ALDL.
- Five passwords have been recorded in the module/receiver.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### REMOTE KEYLESS ENTRY AND PERIMETER/ULTRASONIC ANTI-THEFT SYSTEM

The remote keyless entry and anti-theft system can perform the following functions.

- Remotely lock and unlock the vehicle doors by means of a hand-held, high-frequency transmitter
- Sense intrusion into the vehicle through the doors, the trunk, or the hood
- Activate a warning if an intrusion is detected.
- Automatically re-lock the doors if the door or the trunk is not opened within 30 seconds after the vehicle has been unlocked by remote keyless entry.
- Help the driver find the vehicle in a parking area.
- Communicate serial data to a scan tool to help diagnose system faults.
- Sense movement inside the vehicle if it is equipped with the optional ultrasonic motion detector.

The remote keyless entry/anti-theft system consists of the following components.

- Keyless entry and anti-theft module/receiver.
- Hand-held transmitter.
- SECURITY indicator.
- Rear deck lid open switch.
- Rear deck lid tamper switch.
- Front door tamper switch.
- Door contact switch
- Central locking unit.
- Turn signals.
- Siren.
- Hood open switch.
- Ultrasonic sensor (optional)

### REMOTE LOCKING AND UNLOCKING

The hand-held transmitter locks and unlocks the vehicle doors by sending radio waves to the module/receiver in the vehicle. The effective range of the transmitter varies between 5 and 10 meters (approximately 16 to 32 feet), depending on whether or not objects such as other vehicles are blocking the path of the radio waves.

The transmitter has a LOCK button and an UNLOCK button which function only when the ignition is OFF and all openings (doors, engine hood, rear deck lid) are closed. Pressing the UNLOCK button has the following effects:

- The doors are unlocked
- The turn signals flash twice.

- The module is disarmed.

Pressing the LOCK button has the following effects:

- The doors are locked.
- The turn signals flash once
- The module is armed.

The transmitter has a replaceable battery. The battery is designed to last at least three years before replacement is necessary.

### SECURITY INDICATOR

There is a SECURITY indicator on the instrument panel. After the LOCK button of the transmitter is pressed, the module/receiver is placed in the armed mode, and the SECURITY indicator flashes. The SECURITY indicator turns ON for 0.1 second and OFF for 0.7 second, and it flashes at that frequency until the module/receiver is disarmed.

### INTRUSION SENSING

The anti-theft function is armed if the transmitter sends the LOCK message to the module/receiver when the ignition is OFF. If the hood, the door, or the rear deck lid is opened, the hood open, the door contact, or the rear deck lid open switch will change its input to the module/receiver, and the alarm will be activated unless either of the following conditions has occurred:

- An UNLOCK message was received from the transmitter.
- The front door tamper or the rear deck lid tamper switches indicate key operation.

The alarm will also be activated if the ignition input is changed to battery voltage before either of the following conditions occurs:

- An UNLOCK message was received from the transmitter.
- The front door tamper or the rear deck lid tamper switches indicate key operation.
- The alarm will also be activated if the anti-theft function has been armed and the ultrasonic sensor (optional) detects movement within the vehicle before the front door or rear deck lid tamper switches have indicated key operation.

### SIREN

The remote keyless entry system is armed when the LOCK message is received from the transmitter when the ignition is OFF. When the system is armed, it will activate the siren and flash the turn signals for 28 seconds if any of the following conditions occurs.

- A door is opened without using the key before an UNLOCK signal is received from the transmitter
- The rear deck lid is opened without using the key before an UNLOCK signal is received from the transmitter.



- The hood is opened before an UNLOCK signal is received from the transmitter and before a door or the rear deck lid is unlocked.
- The ignition switch input indicates battery voltage before either a key is used to unlock the vehicle or an UNLOCK signal is received from the transmitter.

The siren is disarmed after it begins to sound an alarm if any of the following conditions occurs:

- The door is opened with the key.
- The rear deck lid is opened with the key.
- The UNLOCK or LOCK button on the remote transmitter is pressed.

## VEHICLE LOCATOR

The remote keyless entry system assists the driver in locating the vehicle. When the vehicle is unlocked with the remote control, the turn signals flash twice to indicate the location of the vehicle. The duration of the flashes and the length of time between flashes is used to indicate certain vehicle conditions. Refer to "Fault or Alarm Indication" in this section.

## AUTOMATIC LOCKING (SAFETY LOCK)

The remote keyless entry system has an automatic locking feature. If the doors are unlocked with the remote transmitter while the control module/receiver is armed, the doors are automatically re-locked after 30 seconds unless any of the following events occurs:

- The door is opened.
- The ignition switch is turned ON.
- The rear deck lid is opened.
- The hood is opened.

## MODULE/RECEIVER

The remote keyless entry module/receiver is contained in the floor console. The module/receiver processes sig-

nals from the remote transmitter and the intrusion sensors, and it activates the alarm if an invasion is detected. The module/receiver also has a self-diagnostic function which will display trouble codes. In order to display trouble codes, a scan tool must be connected to the assembly line diagnostic link (ALDL) connector.

The module/receiver will not communicate with transmitters from other vehicles because there are over four billion possible electronic password combinations. The module/receiver has an attached antenna to detect signals from the transmitter.

## FAULT OR ALARM INDICATION

When the UNLOCK button on the remote transmitter is pressed, the module/receiver will flash the parking lights to indicate information about the remote keyless entry and anti-theft system.

**Normal Condition:** If there has not been an intrusion and no fault has been detected, the module/receiver will signal a normal condition when the UNLOCK button is pressed. The parking lights will flash twice for 0.5-second, with a 0.5-second pause between flashes.

**USS Fault Indication:** If there is a fault in the ultrasonic sensor, the module/receiver will signal the fault when the UNLOCK button is pressed. The parking lights will flash twice for 1 second with a 0.5-second pause between flashes.

**Alarm Indication:** If there has been an intrusion since the last time the LOCK button was pressed, the module/receiver will signal that there has been an intrusion when the UNLOCK button is pressed. The parking lights will flash twice for 0.5-second, and there will be a 1.5-second pause between flashes.

Alarm and fault information in the module/receiver will be erased the next time the module/receiver enters the armed condition after receiving a LOCK message from the transmitter.

**BLANK**

## SECTION 9T

## IMMOBILIZER ANTI-THEFT SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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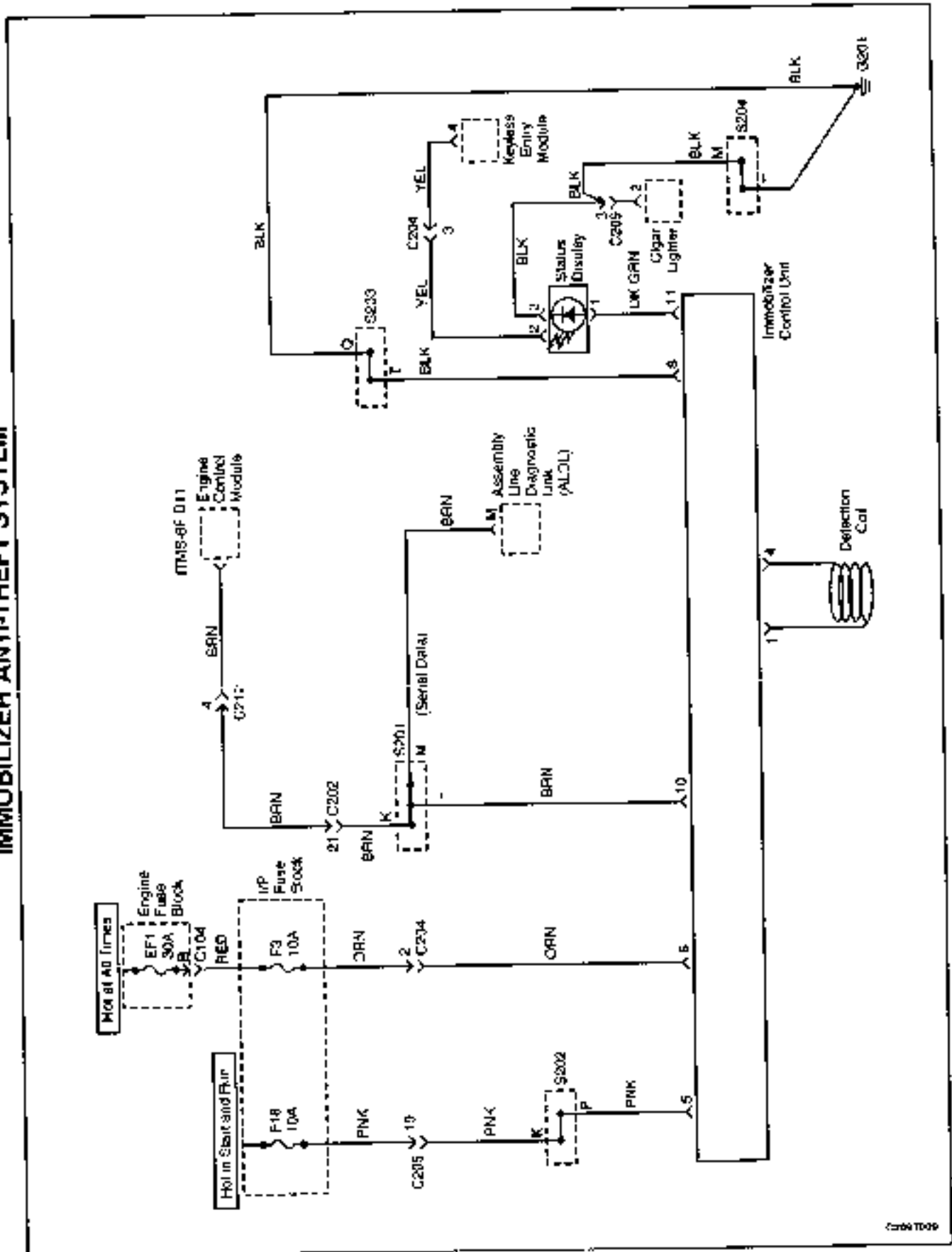
## SPECIFICATIONS

## FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb·Ft	Lb·In
Hood Release Handle Screw	2.5	-	22
Immobilizer Control Unit	4	-	35

# SCHEMATIC AND ROUTING DIAGRAMS

## IMMOBILIZER ANTI-THEFT SYSTEM



7000 TD00

## DIAGNOSIS

### ANTI-THEFT IMMOBILIZER SYSTEM

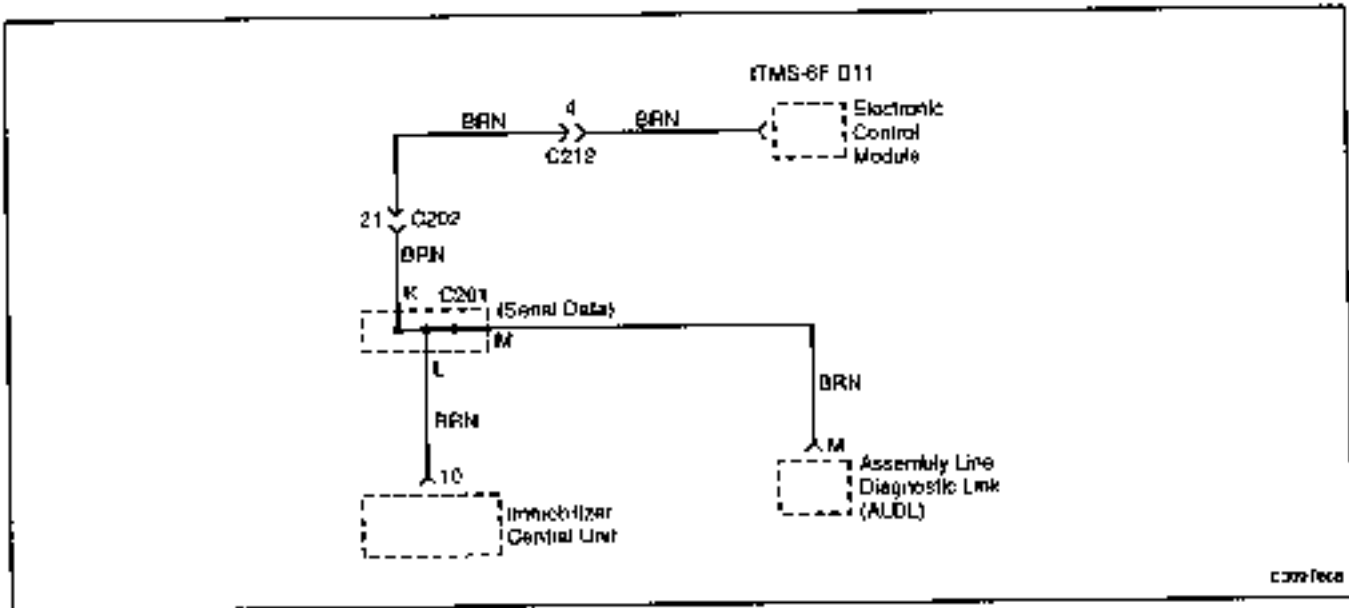
The anti-theft immobilizer system requires diagnosis when it is not possible to start the engine. If the no-start condition occurs because of the immobilizer system, a diagnostic trouble code (DTC) 53 should be set. The immobilizer control unit monitors the detection and reading of the ignition key. The self-test capability is limited to those functions. Faults are communicated to a scan tool during diagnosis, but they are not stored in the immobilizer control unit's memory. Unauthorized use of a scan tool could be a method of defeating the anti-theft immobilizer system, so certain scan tool procedures require

the use of a password. The following functions are password protected.

- Coding of an additional key
- Deleting all key codes
- Deletion of the immobilizer identification (ID) Code
- Deletion of the electronic control module (ECM) identification (ID) code.

The following functions do not require a password:

- Reading an ignition key to determine if the transponder is working or if a key is authorized
- Reading the immobilizer ID-code to verify that it matches the ECM ID-code.



### DIAGNOSTIC TROUBLE CODE (DTC) 53 ECM IMMOBILIZED ERROR

#### Circuit Description

When the ignition is turned ON, the key is tested by the immobilizer anti-theft system. While the key code is being read by the immobilizer control unit, the engine can start and run with any key that will turn the lock cylinder. The key code is read and compared with key codes that have been stored in the memory of the immobilizer control unit. If a valid key is detected, the immobilizer control unit sends a serial data release message to the electronic control module (ECM). Included in the release message is an identification (ID) code which assures that neither the immobilizer control unit nor the ECM have been substituted to defeat the system. If the ECM receives an invalid release message, the ECM performs the following actions:

- Disables the fuel injector circuit.

- Disables the fuel pump circuit.
- Disables the ignition coil.

#### DTC 53 Will Set When

- The ECM does not receive the signal from the immobilizer control module within 0.562 seconds when the vehicle is stationary or within 1.5 seconds when the vehicle is moving.
- The ECM receives an incorrect release message from the immobilizer control unit over 5 times.
- The above conditions are maintained until the ignition switch is turned OFF.

#### DTC 53 Will Clear When

The ignition switch is turned OFF or the scan tool CLEAR CODES command is issued.

## DTC 53 - ECM Immobilized Error

Step	Action	Value	Yes	No
1	Connect the scan tool using the following procedure. 1. Insert the immobilizer data cartridge into the scan tool. 2. Turn the ignition switch to the OFF position. 3. Connect the scan tool to the assembly line diagnostic link (ALDL). 4. Connect the scan tool's power cord to the cigar lighter socket. 5. Turn the ignition ON, but do not start the engine. Is communication established between the scan tool and the immobilizer control unit?	-	Go to Step 2	Go to 'Communication Between Immobilizer and Test Equipment'.
2	Select SYSTEM DIAGNOSIS from the scan tool menu. Does the KEY STATUS message indicate position number (POS NR) 00?	-	Go to 'Key Status Errors'.	Go to Step 3
3	Read the IMMO & ECM ID-CODE message that was displayed after requesting SYSTEM DIAGNOSIS. Does the message ID-CODE DIFFERENT appear?	-	Go to 'Identification (ID) Code Reprogramming'.	Go to Step 4
4	Check for an open circuit between the immobilizer control unit and the ECM. Is the circuit open?	-	Go to Step 5	Go to Step 6
5	Repair the open circuit between the ECM and the immobilizer control unit. Is the repair complete?	-	System OK	-
6	1. Replace the ECM. 2. Reprogram the ID code. Is the repair complete?	-	System OK	-

## KEY STATUS ERRORS

The following KEY STATUS messages may be shown on the scan tool after commanding SYSTEM DIAGNOSIS:

- **IGNITION OFF STATUS.** This message informs the technician that the ignition is off during the key coding process. Turn the ignition ON during key coding, but do not start the engine.
- **KEY IS OCCUPIED.** Only five keys may be coded. If a new key is desired, the previous key codes must be deleted. Up to five keys may then be authorized.
- **ALREADY AUTHORIZED.** Key coding is being attempted with a key that is already authorized.
- **ERROR NO. 001, 002, 003.** There is no communication between the transponder in the ignition key and the detection coil. Follow the steps below to diagnose the problem.
  1. Try a different key. If a different key works, the problem was in the original key.
  2. If trying a different key resulted in the same error message, replace the detection coil.
- **INVALID KEY.** The communication between the immobilizer control unit and the key transponder has not validated the key. Follow the steps below to diagnose the problem:
  1. Code the key. Refer to 'Key Coding Procedure' in this section.
  2. If the same message is received after key coding, check the connection of the detection coil.
  3. If the detection coil is OK, replace the immobilizer. Refer to 'Immobilizer Control Unit' in this section.
- **NO TRANSPONDER DETECTED.** The fault may be in the ignition key transponder, the detection coil or the immobilizer. Follow the steps below to diagnose the problem:
  1. Try a different key. If a different key works, the problem was in the original key.
  2. If trying a different key resulted in the same error message, check the connection of the detection coil.

## 9T - 18 IMMOBILIZER ANTI-THEFT SYSTEM

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3. If the connection of the detection coil is OK, disconnect the detection coil and use an ohmmeter to check for an open detection coil.
4. If the detection coil was not open, replace the immobilizer control unit. Refer to "Immobilizer Control Unit" in this section.

### COMMUNICATION BETWEEN IMMOBILIZER CONTROL UNIT AND TEST EQUIPMENT

1. Connect the test equipment as described in the *Scan Tool Equipment Manual*.

2. If communication between the scan tool and the test equipment was unsuccessful, wait 30 seconds and try again.
3. If communication was not successful on the second try, turn the ignition OFF and check the wire and connectors between the immobilizer control unit terminal 10 and the assembly line diagnostic link (ALDL) terminal M.
4. If the wire and the connectors between the ALDL and the immobilizer control unit are OK, replace the immobilizer control unit. Refer to "Immobilizer Control Unit" in this section.



## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### KEY CODING PROCEDURE

1. Install the immobilizer control unit cartridge in the scan tool.
2. Turn the ignition OFF.
3. Connect the scan tool.
4. Turn the ignition ON with the key to be coded.
5. Enter the four digit password that enables service personnel to use the scan tool for coding keys.
6. A lost key can be deleted only by deleting all keys and reauthorizing the remaining keys as new keys. If a key was lost, go to Step 7. If no keys have been lost, but an additional key is desired, go to Step 8.
7. Use the scan tool command **DELETE ALL KEY CODES**.
8. Use the scan tool command **AUTHORIZE ONE ADDITIONAL KEY**.
9. Repeat Steps 4, 5, and 6 until the immobilizer control unit has recorded all of the new keys or reauthorized all of the remaining keys after a deletion. The immobilizer control unit can record a maximum of five keys.
10. Return the system to the normal mode.
11. Turn OFF the ignition.
12. Turn ON the ignition.
13. Verify that the key coding was successful by starting the engine with each of the authorized keys.

#### IDENTIFICATION CODE REPROGRAMMING

Reprogram the ID code in the following situations:

- An immobilizer control unit is replaced.
- An electronic control module (ECM) is replaced.

If a valid key has been lost, refer to "Key Coding Procedure" in this section.

##### Reprogramming Procedure:

1. Turn the ignition OFF. Reprogramming is not allowed while the engine is running.
2. Insert the immobilizer control unit cartridge into the scan tool.
3. Do not start the vehicle, but turn the ignition ON.
4. Enter the four-digit password that enables service personnel to use the scan tool for ID code reprogramming.
5. Use the scan tool to command **RESET ID CODE**.

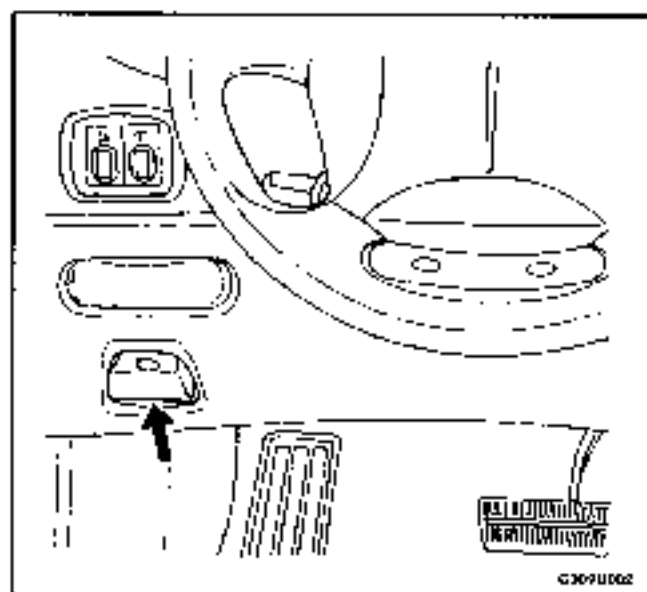
6. Turn the ignition OFF and ON again, but do not crank or start the engine. The ECM will reset the ECM ID code to match the new ID code that was calculated and sent by the immobilizer control unit when the ignition was first turned ON after the reset command.
7. Return the system to the normal mode.
8. Turn OFF the ignition.
9. Turn ON the ignition.
10. Start the engine.

After reprogramming the ID code, the scan tool SYSTEM DIAGNOSIS command can verify that the ECM ID code matches the immobilizer control unit ID code.

If the reprogramming procedure does not result in matching ID codes, check the electrical connectors for the serial data wire between the immobilizer control unit and the ECM.

### IGNITION KEY TRANSPONDER

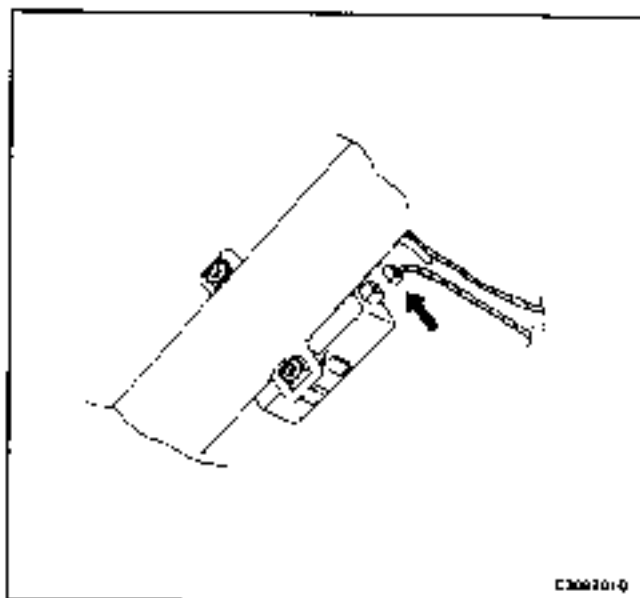
If a transponder is faulty, the ignition key must be replaced. It is not possible to install a new transponder into a key.



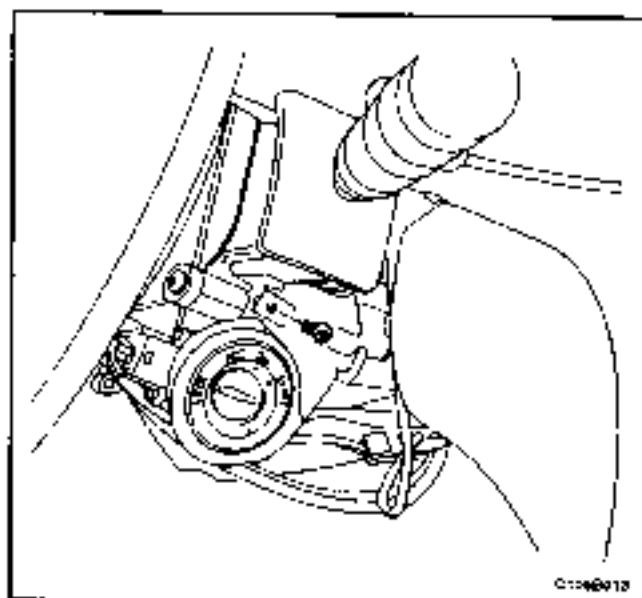
### DETECTION COIL

#### Removal Procedure

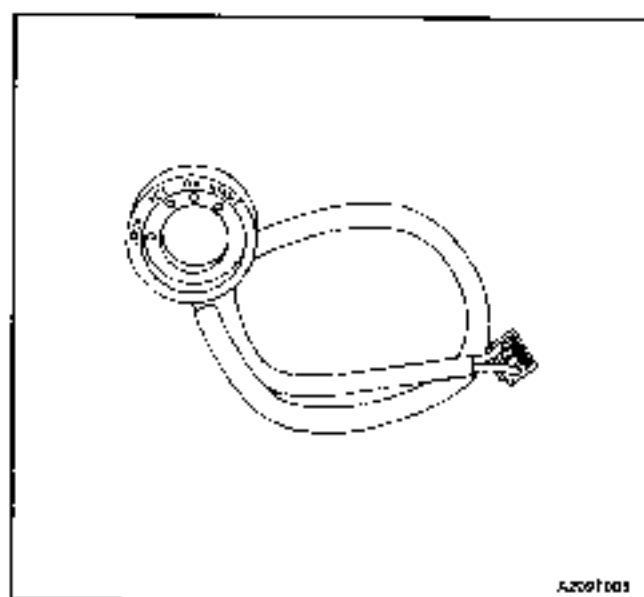
1. Remove the screw that attaches the hood release handle.



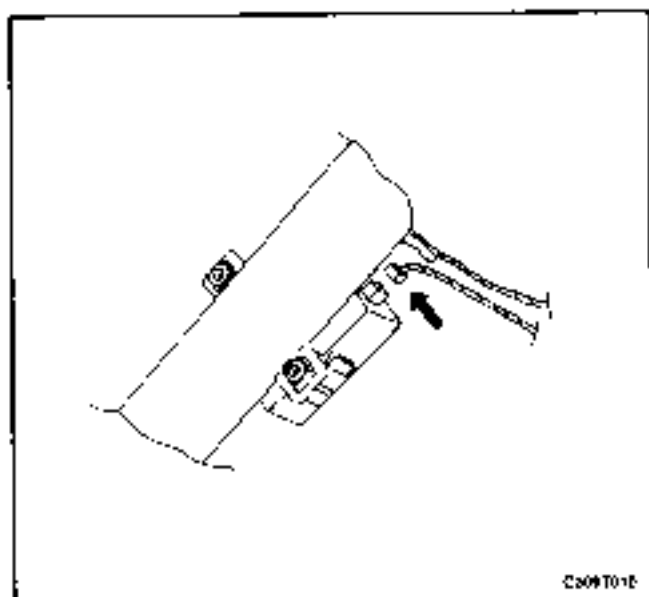
- 2 Carefully remove the instrument panel lower cover by pulling until the retaining clips are free from the slots in the instrument panel.
- 3 Remove the steering column lower cover. Refer to Section 6E, *Steering Wheel and Column*.
- 4 Disconnect the two-pin connector from the immobilizer.



- 5 Remove the ignition switch keyhole lamp retaining screw and the lamp.

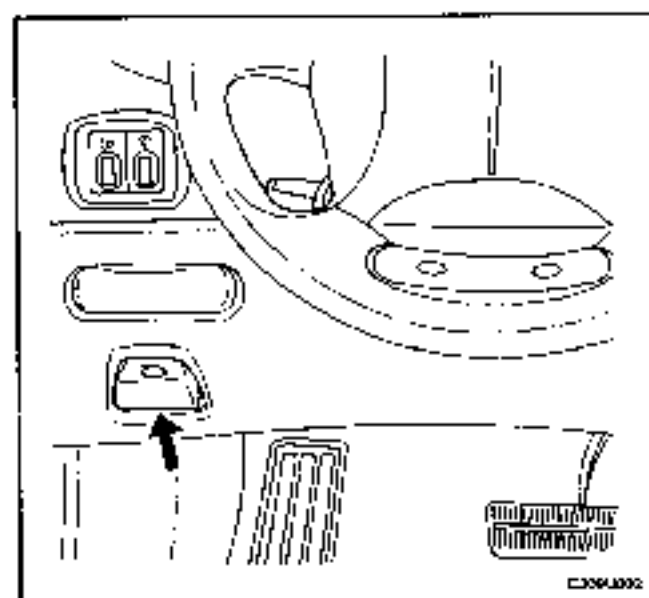


- 6 Pry the detection coil away from the lock cylinder. If the detection coil will be replaced with a new one, it does not matter if the key position trim ring is damaged during removal. A new trim ring is part of the new detection coil.



### Installation Procedure

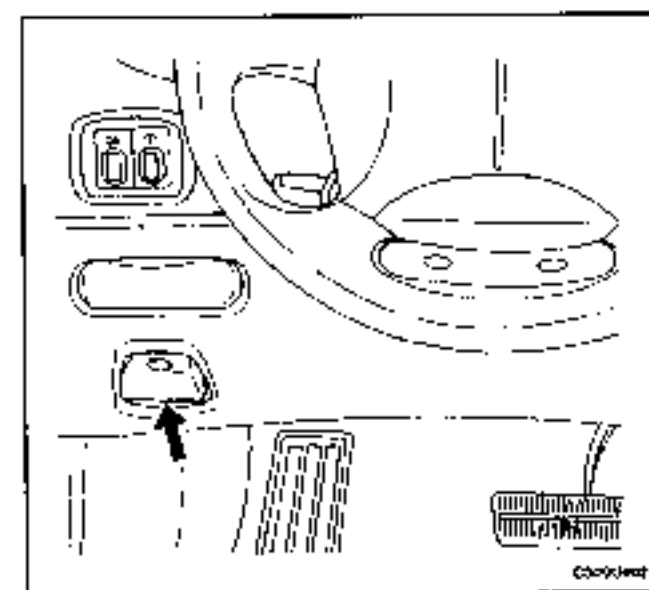
1. Install the detection coil by pressing it onto the lock cylinder until it snaps in place.
2. Install the ignition switch keyhole tamper with the retaining screw.
3. Connect the two-pin connector to the immobilizer.



4. Install the steering column lower cover. Refer to Section 6E, *Steering Wheel and Column*.
5. Install the instrument panel lower cover.
6. Install the screw that attaches the hood release handle.

### Tighten

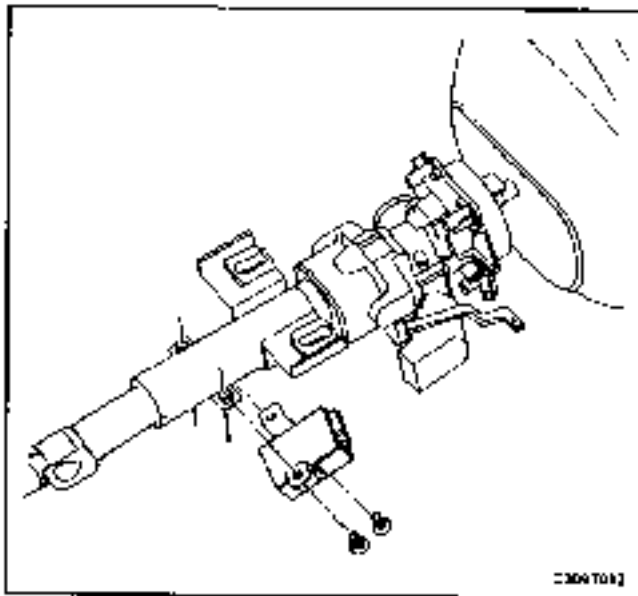
Tighten the hood release handle screw to 2.5 N•m (22 lb-in).



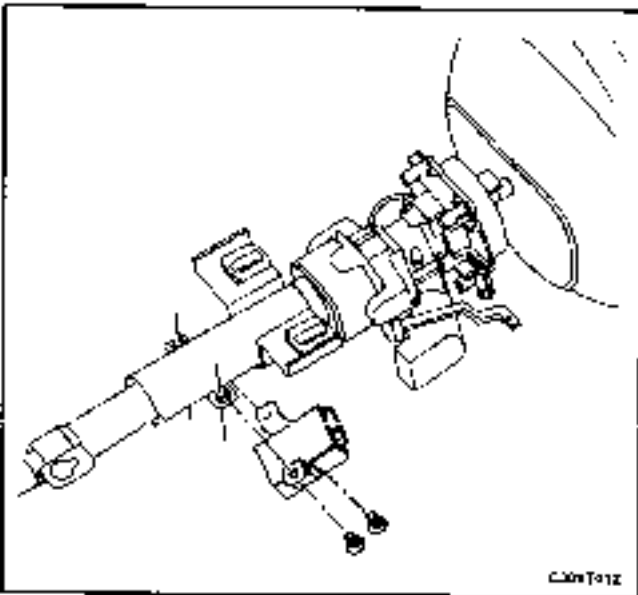
## IMMOBILIZER CONTROL UNIT

### Removal Procedure

1. Remove the screw that attaches the hood release handle.



2. Carefully remove the instrument panel lower cover by pulling until the retaining clips are free from the slots in the instrument panel.
3. Remove the steering column lower cover. Refer to Section 6E, *Steering Wheel and Column*.
4. Disconnect the two electrical connectors from the immobilizer control unit.
5. Remove the immobilizer control unit.



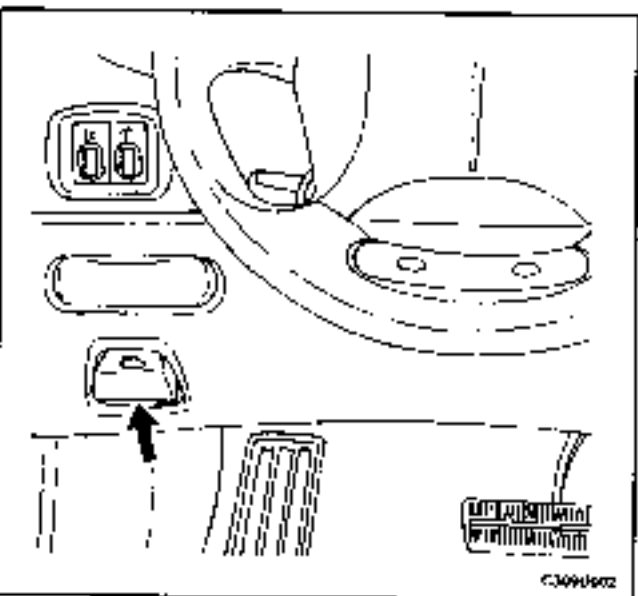
### Installation Procedure

**Important:** After replacing the immobilizer, the ignition keys must be re-authorized using the key coding procedure. Refer to "Key Coding Procedure" in this section. Also, the electronic control module (ECM) identifier (ID) code must be reset. Refer to "Identification Code Reprogramming" in this section.

1. Install the immobilizer control unit.

#### Tighten

Tighten the immobilizer control unit mounting bolts to 4 N·m (35 lb-in).



2. Connect the electrical connectors to the immobilizer control unit.
3. Install the steering column lower cover. Refer to Section 6E, *Steering Wheel and Column*.
4. Install the instrument panel lower cover.
5. Install the screw that attaches the hood release handle.

#### Tighten

Tighten the hood release handle screw to 2.5 N·m (22 lb-in).

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### IMMOBILIZER SYSTEM

The purpose of the immobilizer system is to prevent the vehicle from being stolen or driven by unauthorized users.

Authorization is accomplished by the use of an electronically coded key. When the ignition is turned ON, the key is tested by the immobilizer system. While the key code is being read by the immobilizer control unit the engine can start and run with any key that will turn the lock cylinder. The key code is read and compared with key codes that have been stored in the immobilizer control unit's memory. If a valid key is detected, the immobilizer control unit sends a serial data release message to the electronic control module (ECM). Included in the release message is an identification (ID) code which assures that neither the immobilizer control unit nor the ECM have been substituted to defeat the system. If the ECM does not receive a release message within a specified time, or if the ID-codes do not match, the ECM performs the following actions:

- Disables the fuel injector circuit.
- Disables the fuel pump circuit.
- Disables the ignition coil.
- Sets Diagnostic Trouble Code (DTC) 53

The above conditions are maintained until the ignition is turned OFF.

The immobilizer control unit system consists of the following components:

- Electronically coded keys.
- Detection coil.
- Immobilizer control unit.
- ECM.
- Instrument cluster indicator.
- Assembly line diagnostic link (ALDL) connector to provide serial data access for a scan tool.

An ECM for a vehicle without an immobilizer control unit cannot be interchanged for an ECM that is used with an immobilizer control unit system. The immobilizer control unit and ECM must have a matching ID code. ID coding and key coding are accomplished by using a scan tool.

### ELECTRONICALLY CODED KEYS

Each valid ignition key has an internal transponder which transmits a unique code. When a key is inserted into the ignition lock, the transponder is inductively coupled to the detection coil. The transponder interacts with the detection coil to generate an amplitude modulated signal which is conducted from the detection coil to the immobilizer control unit. The immobilizer control unit reads the radio frequency signal and a release message

is sent to the electronic control module if the key is authorized.

New keys are coded by using a scan tool. Refer to "Key Coding Procedure" in this section.

### DETECTION COIL

A detection coil is mounted at the ignition lock as an integral part of the key position trim ring. The wires to and from the detection coil are connected to the immobilizer. When the ignition is turned ON, the immobilizer energizes the detection coil and the coil is coupled inductively to the transponder in the ignition key. The immobilizer sends a modulated signal to the detection coil and the signal is changed by interaction with the internal transponder in the ignition key. The immobilizer reads the signal from the detection coil and determines whether or not the key is authorized.

### IMMOBILIZER CONTROL UNIT

The immobilizer control unit is an electronic module in the instrument panel which verifies the validity of an ignition key when the ignition is turned ON. To accomplish its purpose, the immobilizer control unit performs the following actions:

- Learns and stores the codes of valid keys.
- Reads the radio frequency input from the ignition key.
- Compares the received code with the codes of the valid keys.
- Sends a release message to the electronic control module (ECM) if a valid key has been inserted.
- Calculates and transmits identification (ID) codes within each release message.
- Controls the status indicator in the instrument cluster.
- Monitors system faults.
- Supports system test functions.

### Normal Operation

When the ignition is turned ON, the immobilizer control unit reads the key code transmitted by the transponder in the ignition key. If a valid key is detected, the immobilizer control unit sends a release message to the ECM, and the immobilizer control unit switches to the inactive mode. The release message contains an ID code. Immobilization will be performed by the ECM if no release message is received, or if the ID code in the ECM does not match the immobilizer control unit ID code. If a non-valid key is detected, the release message is not sent to the ECM.

### Assembly Line Diagnostic Link (ALDL) Mode

When the ignition is on, a scan tool can switch the immobilizer control unit to the assembly line diagnostic link (ALDL) mode for the purpose of diagnostics, key coding, or ID coding.

### ID-Code Handling

One of 65 535 possible ID codes is stored in the immobilizer control unit's memory. The ID code can be erased by using the scan tool's RESET ID CODE command. When the immobilizer control unit calculates a new ID code, the ECM ID code must be reset to match the immobilizer control unit ID code. To reset the ID code refer to "Identification Code Reprogramming." During diagnostic procedures, the ID code can be read for comparison with the ECM ID code by using the scan tool's READ IMMOBILIZER CONTROL UNIT ID-CODE command.

### SERIAL DATA LINK

Serial data can be exchanged between a scan tool, electronic control module (ECM), and the immobilizer control unit. The scan tool connection is the assembly line diagnostic link (ALDL).

### ELECTRONIC CONTROL MODULE (ECM)

When the electronic control module (ECM) detects that the ignition is being turned ON, the ECM waits for a release message from the immobilizer control unit. If a re-

lease message is not received within a specified time, the ECM disables the engine. The engine is also disabled if the identification (ID) code transmitted by the immobilizer control unit does not match the code stored in the ECM's memory. Immobilization remains in effect until the ignition is turned OFF or battery power is removed.

To prevent the vehicle from being driven, the ECM applies the following strategy:

- The ignition module is put in a bypass mode.
- The ECM will not create an electronic spark timing (EST) output, so no spark will be generated by the ignition coil.
- The ECM will not enable the fuel pump.
- The ECM will not enable the fuel injectors.
- The ECM sets Diagnostic Trouble Code (DTC) 53.

Serial data communication is transmitted on a single wire between the immobilizer control unit and the ECM. During diagnostic procedures or ID code changing a scan tool is added to the communication system.

An ECM with an immobilizer control unit is not interchangeable with the ECM without an immobilizer control unit.





## SECTION 9U

# CRUISE CONTROL SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in **LOCK** unless otherwise noted.

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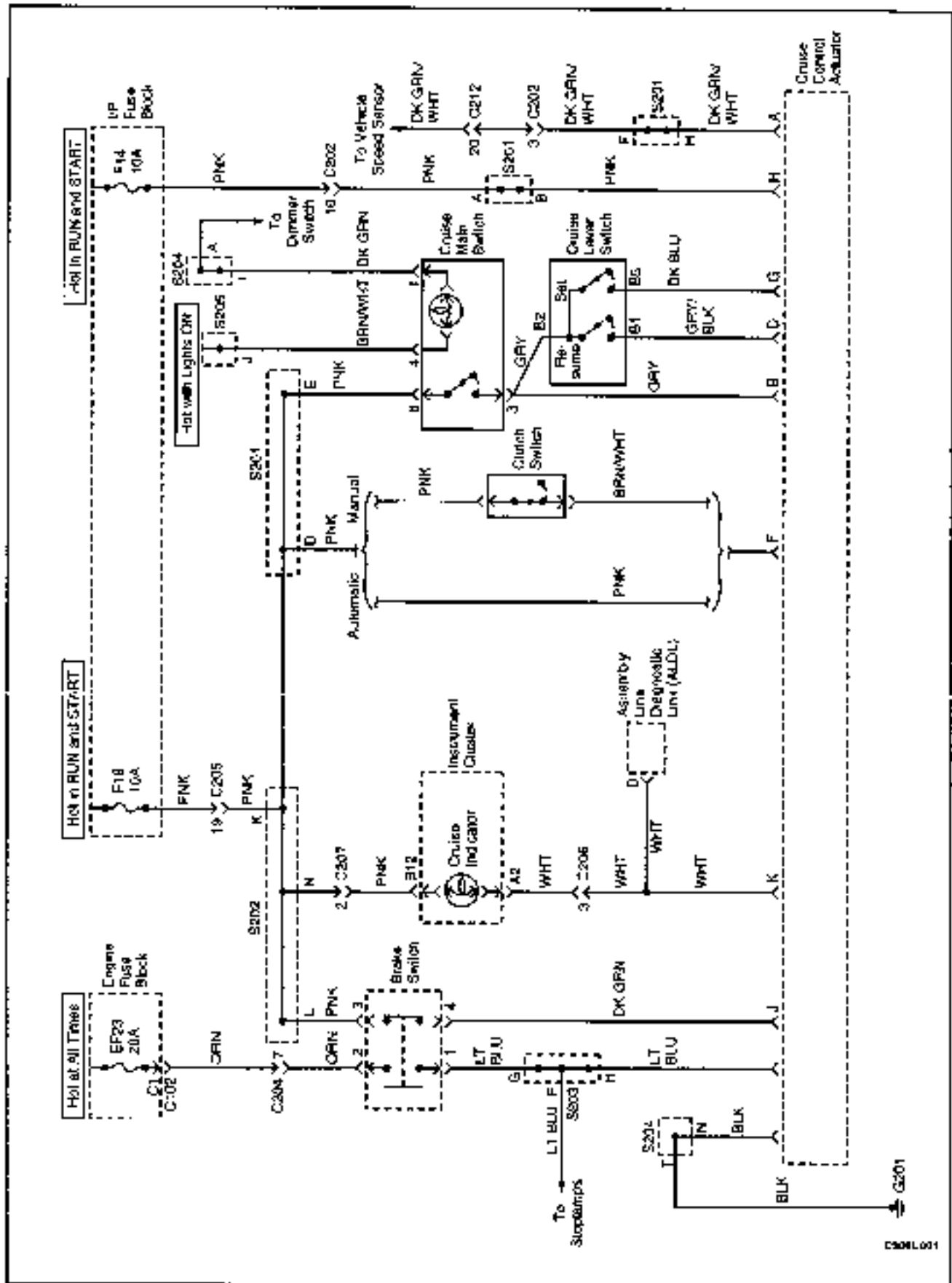
## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N·m	Lb-Ft	Lb-In
Actuator Mounting Bolts	6	-	53
Hood Release Handle Screw	2.5	-	22
Steering Column Cover Retaining Screws	9	-	27

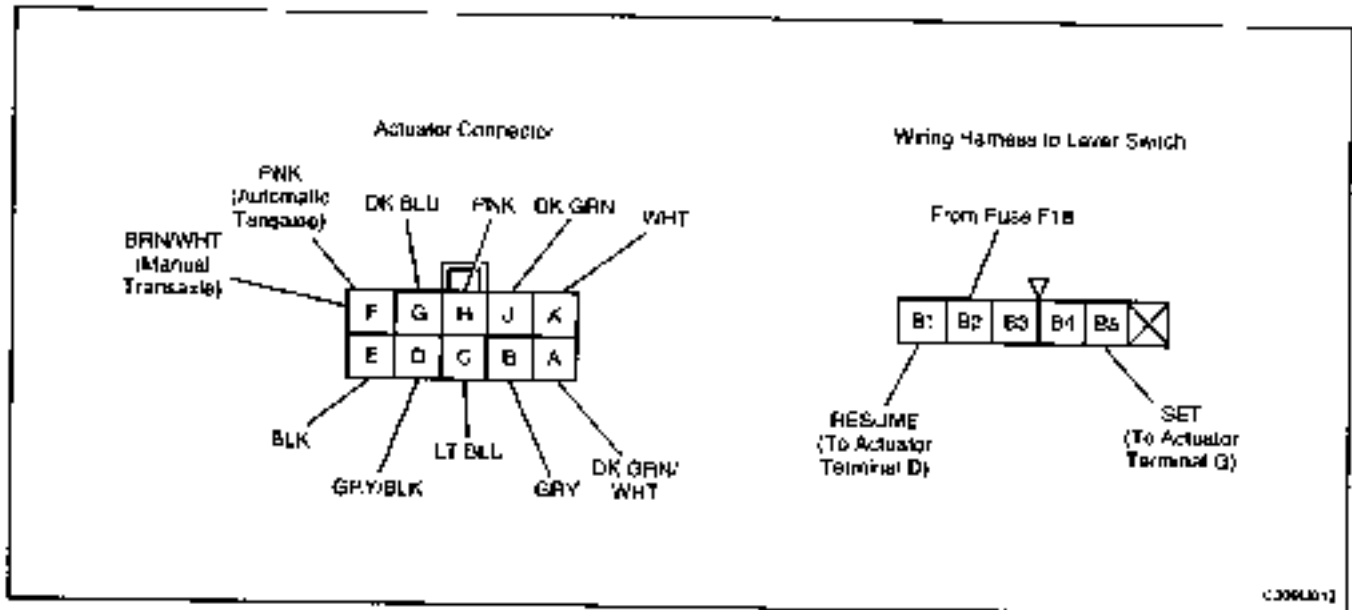
# SCHEMATIC AND ROUTING DIAGRAM

## CRUISE CONTROL SYSTEM



C306L001

## DIAGNOSIS



## CRUISE CONTROL

## Test Description

The number(s) below refer to step(s) on the diagnostic table.

- 5 The electromagnetic clutch in the cruise control actuator is grounded through the brake lamps.

## Cruise Control Does Not Operate

Step	Action	Value(s)	Yes	No
1	Visually inspect the cruise control system and verify the following conditions: <ul style="list-style-type: none"> <li>• The electrical connector is correctly attached to the cruise control actuator.</li> <li>• The actuator and the bracket are not loose.</li> <li>• The cable is not bent or kinked.</li> <li>• The cable adjuster is correctly attached to its bracket.</li> <li>• The cable and bushing are correctly attached to the accelerator assembly.</li> <li>• The cable is properly adjusted.</li> </ul> Have all of the above conditions been verified?	-	Go to Step 3	Go to Step 2
2	Make repairs to the components of the cruise control system that were observed to be faulty in Step 1. Is the repair complete?	-	System OK	-
3	1. Connect a scan tool to the Assembly Line Diagnostic Link (ALDL) and to a power source. 2. Check for engine control diagnostic trouble codes (DTCs). Is a vehicle speed sensor DTC present?	-	Go to Step 5	Go to Step 4

## Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
4	Diagnose the vehicle speed sensor DTC before continuing with this diagnostic table. After the vehicle speed sensor system has been repaired, is the cruise control still inoperative?	-	Go to Step 5	System OK
5	Observe the brake lamps when the brakes are being applied. Do the brake lamps turn ON when the brakes are applied and turn OFF when the brakes are not applied?	-	Go to Step 7	Go to Step 6
6	Repair the brake lamp system. Does the cruise control operate after the brake lamp system has been repaired?	-	System OK	Go to Step 7
7	Check fuses F14 and F18. Is a fuse blown?	-	Go to Step 8	Go to Step 9
8	1. Check for a short circuit and repair if necessary. 2. Replace the blown fuse(s). Is the repair complete?	-	System OK	-
9	1. Turn the ignition ON. 2. Check the voltage at fuses F14 and F18. Is the specified voltage available at fuses F14 and F18?	11-14 v	Go to Step 11	Go to Step 10
10	Repair the power supply to the fuse(s). Is the repair complete?	-	System OK	-
11	1. Disconnect the electrical connector from the cruise control actuator. 2. Turn the ignition ON. 3. Check the voltage at terminal H of the connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 13	Go to Step 12
12	Repair the open circuit between fuse F14 and the cruise control actuator. Is the repair complete?	-	System OK	-
13	With the electrical connector still removed from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal E and ground. Does the ohmmeter indicate the specified value?	< 0 $\Omega$	Go to Step 15	Go to Step 14
14	Repair the open circuit between ground and terminal E of the actuator connector. Is the repair complete?	-	System OK	-
15	With the electrical connector still removed from the cruise control actuator, use an ohmmeter to measure the resistance between connector terminal C and ground. Does the ohmmeter indicate the specified value?	< 0 $\Omega$	Go to Step 17	Go to Step 16
16	Repair the open circuit between the actuator connector terminal C and the instrument S204. Is the repair complete?	-	System OK	-
17	1. Turn the ignition ON. 2. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal J of the connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 19	Go to Step 18

## Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
18	Repair the open circuit between fuse F18 and terminal J of the cruise control actuator. Is the repair complete?	-	System OK	-
19	1. Turn the ignition ON. 2. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal F of the connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 21	Go to Step 20
20	Repair the open circuit between fuse F18 and terminal F of the cruise control actuator. Is the repair complete?	-	System OK	-
21	1. Turn the ignition ON. 2. Make sure that the cruise main switch is OFF. 3. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal B of the connector. Is the voltage equal to the specified value?	~ 0 v	Go to Step 23	Go to Step 22
22	Repair the short to voltage between the cruise main switch and the cruise control actuator terminal B. Is the repair complete?	-	System OK	-
23	1. Turn the ignition ON. 2. Make sure that the cruise main switch is ON. 3. With the electrical connector still removed from the cruise control actuator, use a voltmeter to check the voltage at terminal B of the connector. Is the voltage equal to the specified value?	11-14 v	Go to Step 28	Go to Step 24
24	1. Remove the cruise control main switch for testing, but leave the electrical connector attached. 2. Turn the ignition ON. 3. Check the voltage at the PNK wire at the cruise main switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 26	Go to Step 25
25	Repair the open circuit in the PNK wire between fuse F18 and the cruise control main switch. Is the repair complete?	-	System OK	-
26	1. With the cruise control main switch removed for testing, turn the ignition ON. 2. Turn the cruise control main switch ON. 3. Check the voltage at the GRAY wire at the cruise main switch. Is the voltage equal to the specified value?	11-14 v	Go to Step 28	Go to Step 27
27	Replace the cruise control main switch. Is the repair complete?	-	System OK	-
28	1. Turn the ignition ON. 2. Turn the cruise control main switch ON. 3. With the electrical connector still removed from the cruise control actuator, check the voltage at terminals D and G of the connector. Is the voltage equal to the specified value?	~ 0 v	Go to Step 32	Go to Step 29

**Cruise Control Does Not Operate (Cont'd)**

Step	Action	Value(s)	Yes	No
29	<ol style="list-style-type: none"> <li>1. Disconnect the 6-pin connector at the cruise control lever switch.</li> <li>2. Turn the ignition ON.</li> <li>3. Turn the cruise control main switch ON.</li> <li>4. With the electrical connector still removed from the cruise control actuator, check the voltage at terminals G of the cruise control actuator.</li> </ol> Is the voltage equal to the specified value?	0 v	Go to Step 30	Go to Step 31
30	Replace the cruise control lever switch. Is the repair complete?	-	System OK	-
31	Repair the short to voltage between the cruise control lever switch and the cruise control actuator. Is the repair complete?	-	System OK	-
32	<ol style="list-style-type: none"> <li>1. Turn the ignition ON.</li> <li>2. Turn the cruise control main switch ON.</li> <li>3. Select SET on the cruise control lever switch.</li> <li>4. While holding the lever switch in the SET position, check the voltage at terminal G of the connector for the cruise control actuator.</li> </ol> Does the voltmeter indicate the specified value?	11-14 v	Go to Step 33	Go to Step 37
33	<ol style="list-style-type: none"> <li>1. Turn the ignition ON.</li> <li>2. Turn the cruise control main switch ON.</li> <li>3. Select RESUME on the cruise control lever switch.</li> <li>4. While holding the lever switch in the RESUME position, check the voltage at terminal D of the connector for the cruise control actuator.</li> </ol> Does the voltmeter indicate the specified value?	11-14 v	Go to Step 34	Go to Step 37
34	<ol style="list-style-type: none"> <li>1. Turn the ignition OFF.</li> <li>2. Disconnect the vehicle speed sensor (VSS).</li> <li>3. Use an ohmmeter to check continuity between the DK GRN/WHT wire at the VSS and terminal A of the cruise control actuator connector.</li> </ol> Does the ohmmeter indicate the specified value?	<math>\infty</math> 0 $\Omega$	Go to Step 36	Go to Step 35
35	Repair the open circuit between the VSS and the cruise control actuator connector terminal A. Is the repair complete?	-	System OK	-
36	Replace the cruise control actuator. Is the repair complete?	-	System OK	-
37	<ol style="list-style-type: none"> <li>1. Disconnect the 6-pin connector at the cruise control lever switch.</li> <li>2. Turn the ignition ON.</li> <li>3. Turn the cruise control main switch ON.</li> <li>4. Refer to the illustration of "Wiring Harness to Lever Switch" and test the voltage at terminal B2 of the wiring harness connector.</li> </ol> Is the voltage equal to the specified value?	11-14 v	Go to Step 39	Go to Step 38
38	Repair the open circuit between the cruise control main switch and the cruise control lever switch. Is the repair complete?	-	System OK	-

## Cruise Control Does Not Operate (Cont'd)

Step	Action	Value(s)	Yes	No
39	<p>1. Use an ohmmeter to check for an open circuit between terminal B1 of the wiring harness at the lever switch and terminal D of the actuator connector.</p> <p>2. Also use the ohmmeter to check for an open circuit between terminal B5 of the wiring harness at the lever switch and terminal G of the actuator connector.</p> <p>Does the ohmmeter indicate the specified value for both measurements?</p>	- 0 Ω	Go to Step 40	Go to Step 41
40	<p>Replace the lever switch.</p> <p>Is the repair complete?</p>	-	System OK	-
41	<p>Repair the open circuit between the lever switch connector and the actuator connector.</p> <p>Is the repair complete?</p>	-	System OK	-

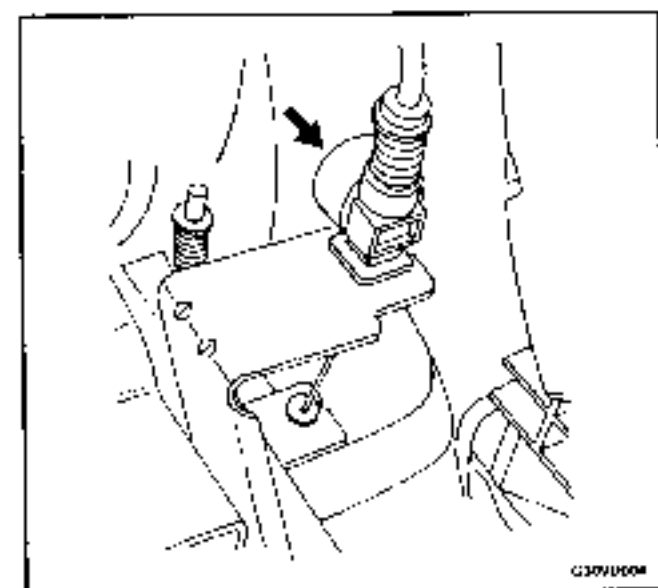
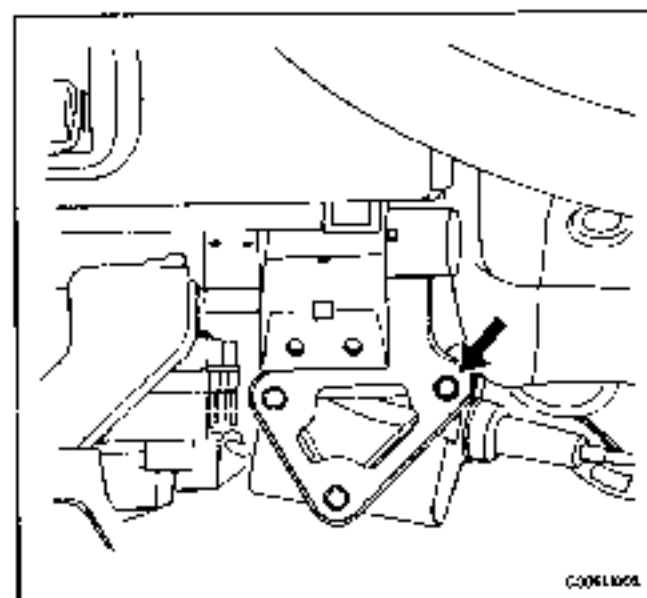
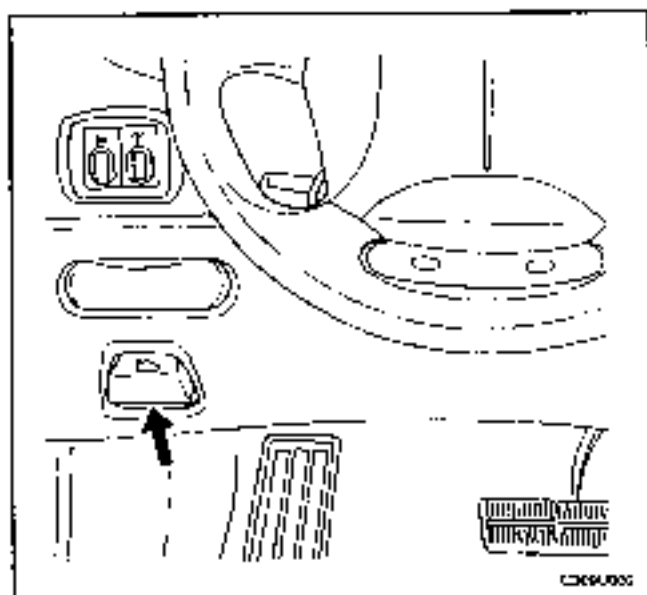
## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

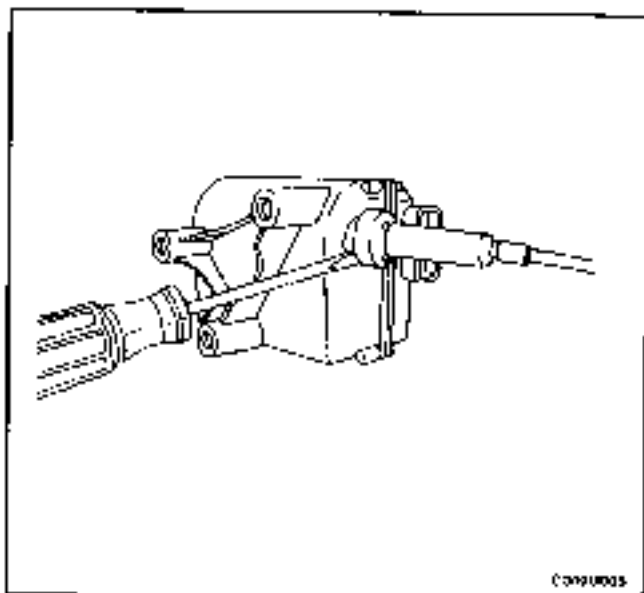
#### CRUISE CONTROL ACTUATOR

##### Removal Procedure

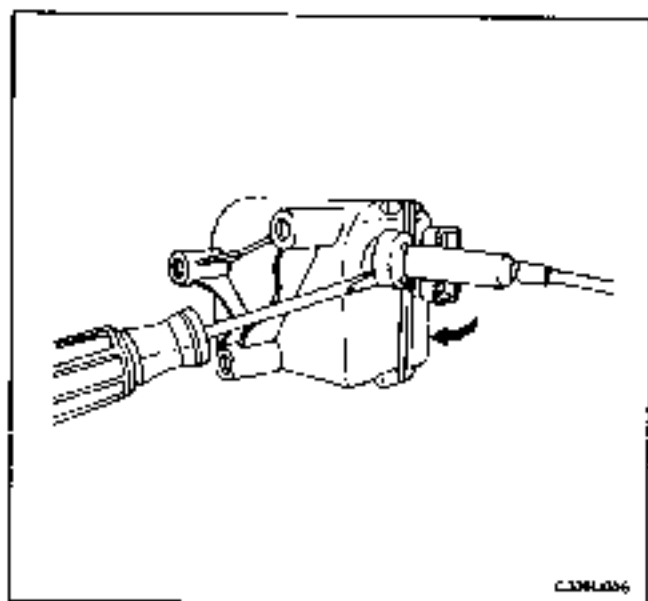
1. Remove the screw that attaches the hood release handle.
2. Carefully remove the knee holster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
3. Disconnect the electrical connector from the cruise control actuator.
4. Remove the cruise control actuator mounting bolts.
5. Press the release button on the cable adjuster and push the cable inward the adjuster until the spring is compressed.



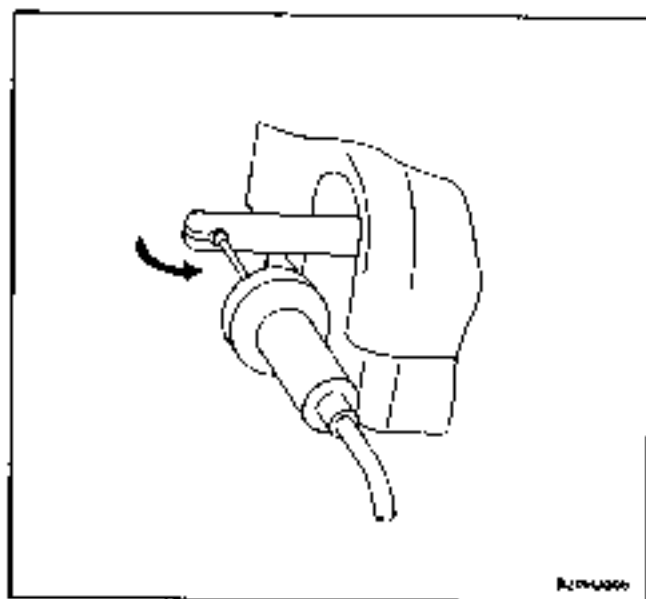




6. Tilt the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.

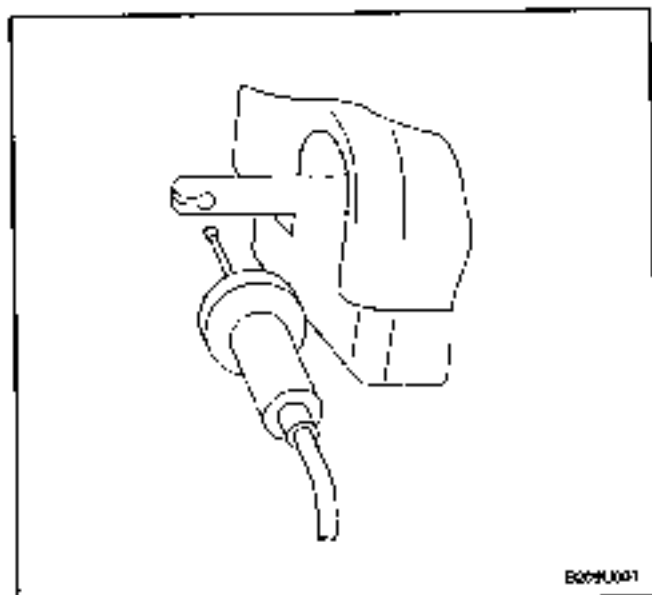


7. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.



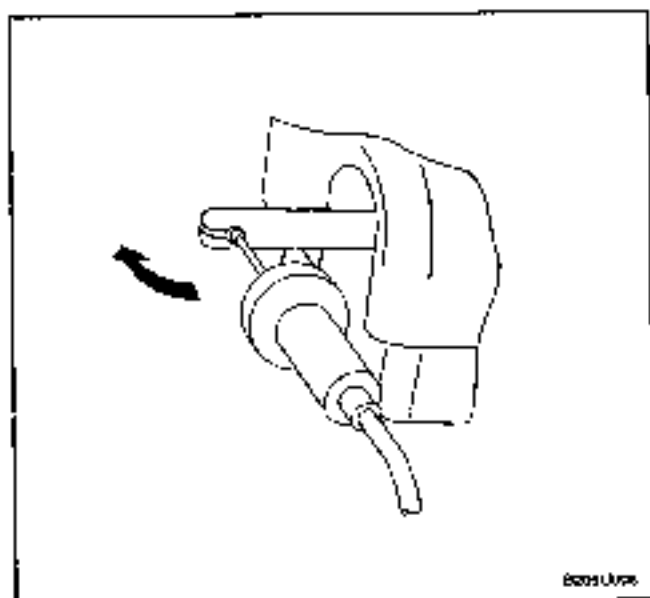
8. Pull the guide sleeve and the cable out of the actuator and turn the cable 90 degrees to the axis of the guide sleeve.

9. Remove the actuator from the cable.



### Installation Procedure

1. Insert the cable ball into the actuator cable sleeve

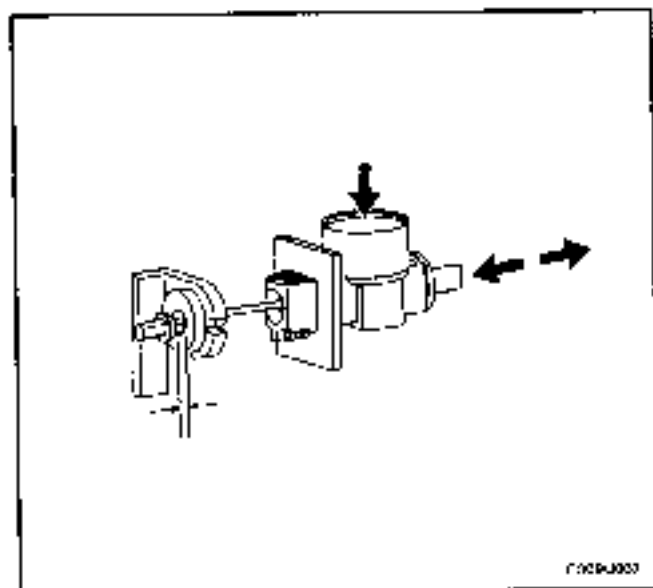


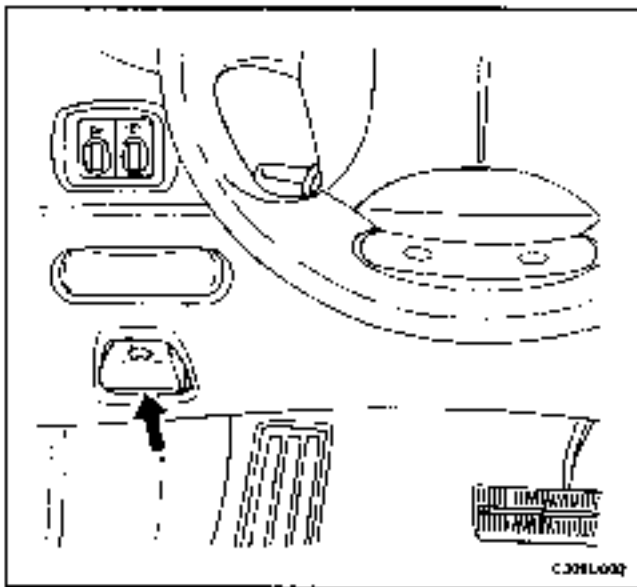
2. Push the cable housing and sleeve into the actuator until the retainers lock the cable housing in place.  
3. Install the cruise control actuator mounting bolts.

### Tighten

Tighten the cruise control actuator mounting bolts to 6 N•m (53 lb-in)

4. Press the cable adjuster button and adjust the cable so that the cable ball nipple is 0.5 mm (0.02 inch) from the bushing on the accelerator assembly.

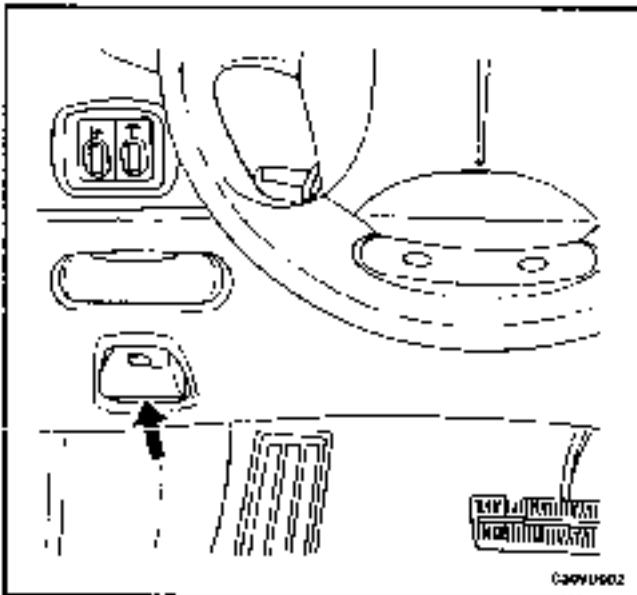




5. Connect the electrical connector to the cruise control actuator.
6. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
7. Install the hood release handle screw

**Tighten**

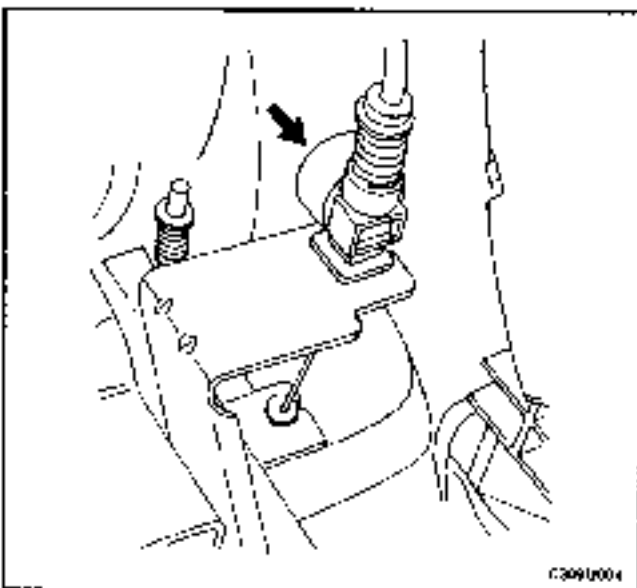
Tighten the hood release handle screw to 2.5 Nm (22 lb-in)



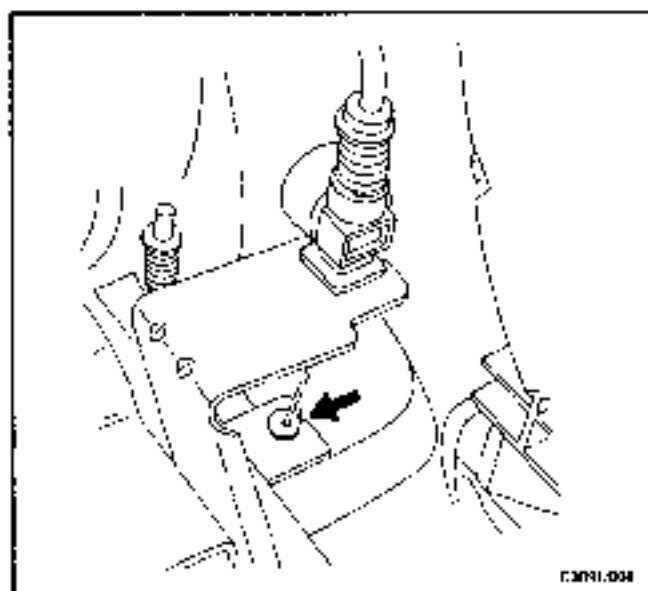
**ACTUATOR CONTROL CABLE**

**Removal Procedure**

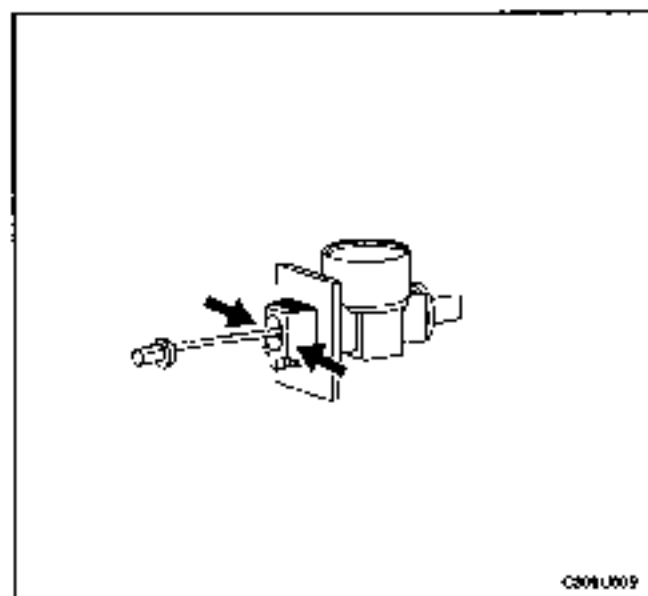
1. Remove the screw that attaches the hood release handle.



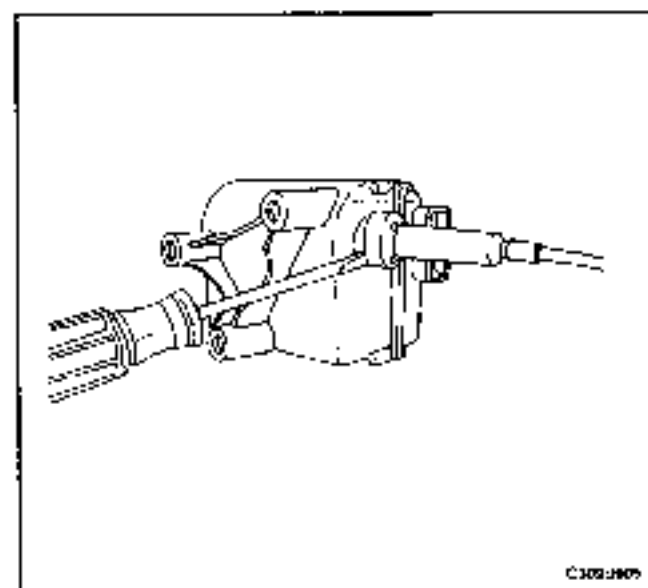
2. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
3. Press the release button on the cable adjuster and push the cable toward the adjuster until the spring is compressed



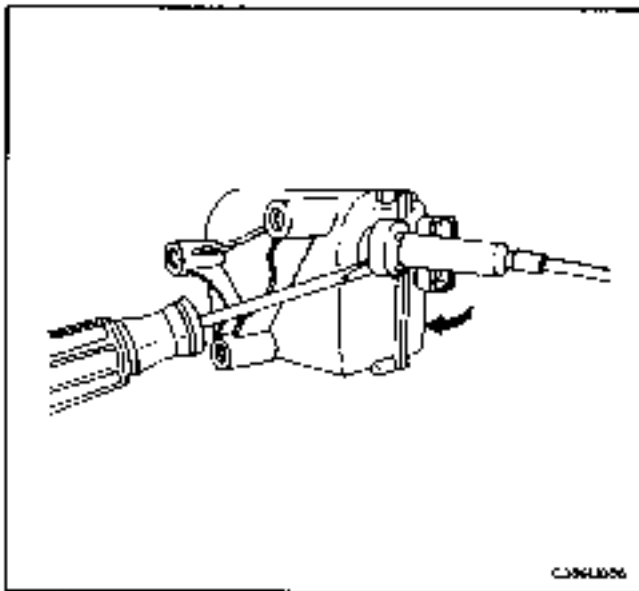
4. Remove the cable bushing from the accelerator assembly.



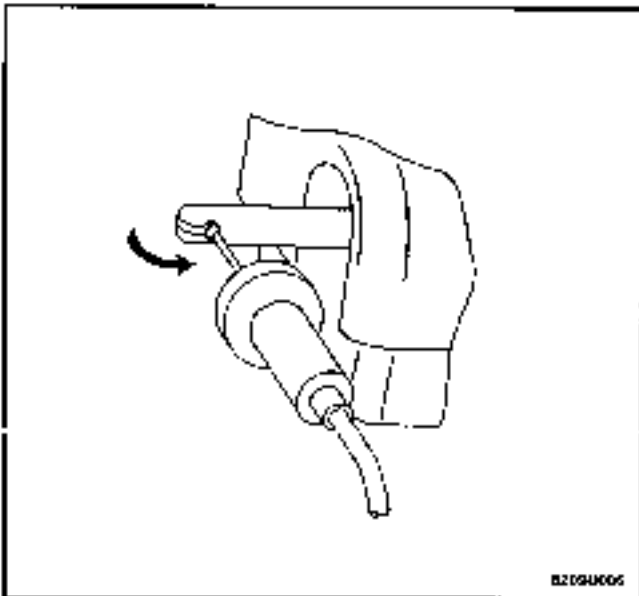
5. Depress the retaining tabs of the cable adjuster and remove the adjuster from the mounting bracket.



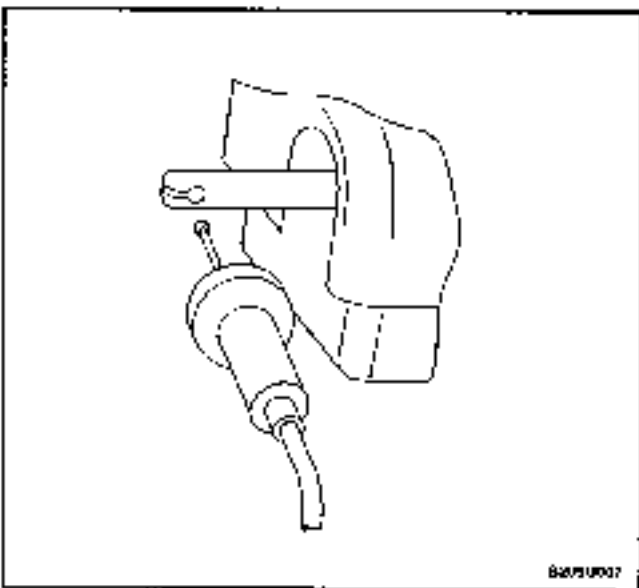
6. Tip the cable housing and insert a flat-blade screwdriver into one of the slots in the actuator.



7. Tilt the cable housing toward the screwdriver. The cable housing retainers will release.



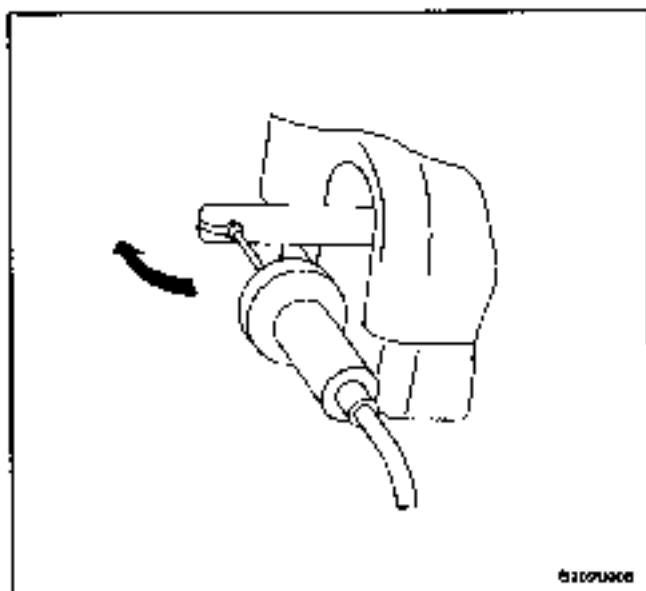
8. Pull the guide sleeve and the cable out of the actuator and turn the cable 90 degrees to the axis of the guide sleeve.



9. Remove the actuator from the cable.

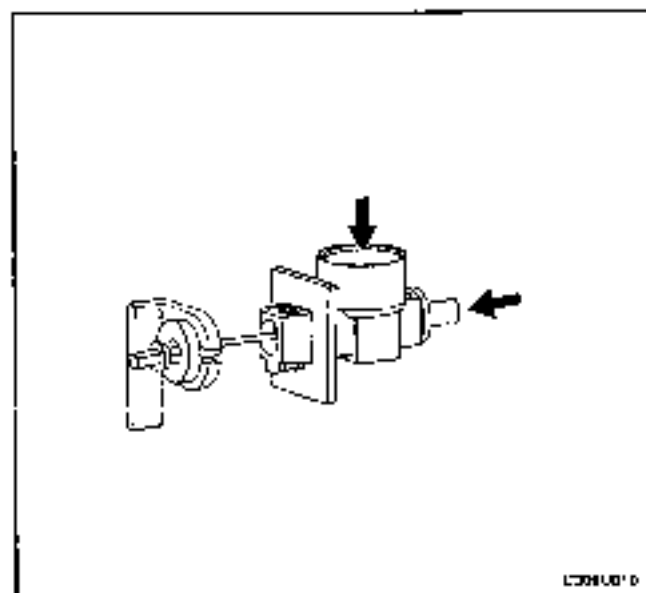
### Installation Procedure

1. Insert the bail of the cable assembly into the slot in the actuator rod and then rotate the cable 90 degrees.



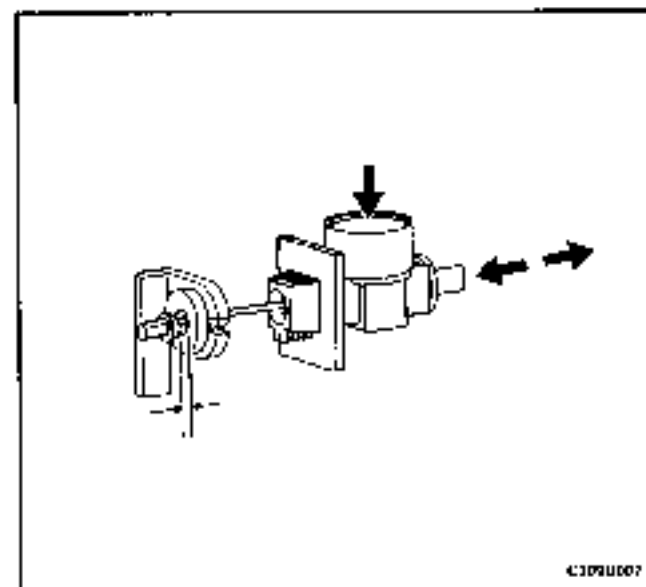
C109U006

2. Push the guide sleeve onto the actuator rod and press the cable housing onto the actuator until it is locked in place by the retainers.
3. Clip the cable adjuster into the bracket of the pedal mount assembly.
4. Press the cable release button and slide the cable into the adjuster until the spring is fully compressed.

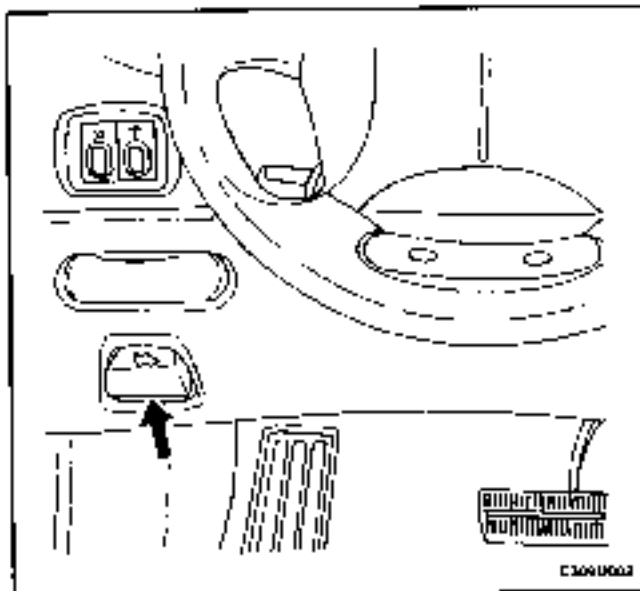


C109U010

5. Install the cable bushing into the pedal assembly.
6. Press the cable release button and adjust the cable to achieve a gap of 0.5 mm (0.2 inch) between the bushing and the nipple of the ball.



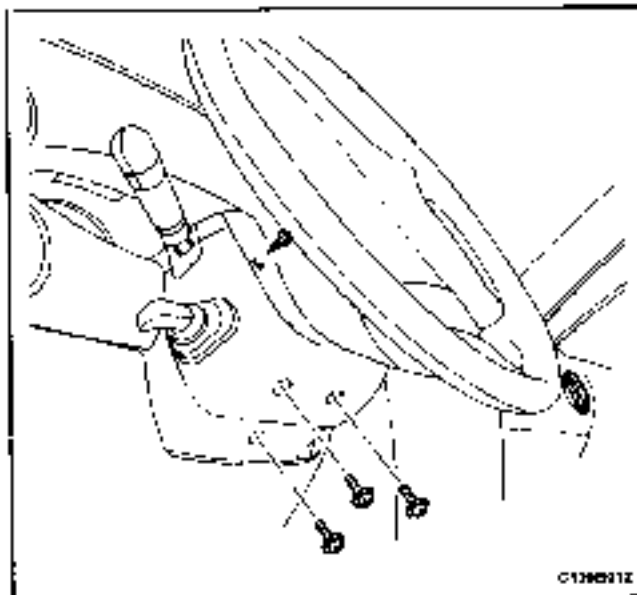
C109U007



7. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
8. Install the hood release handle screw.

**Tighten**

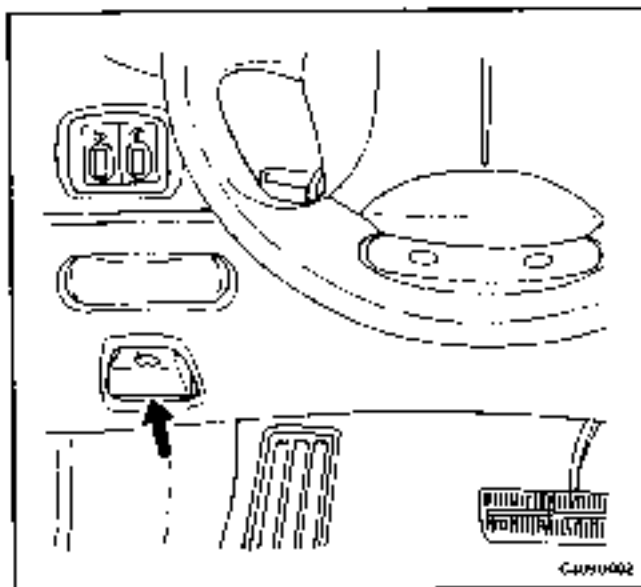
Tighten the hood release handle screw to 2.5 N•m (22 lb-in).



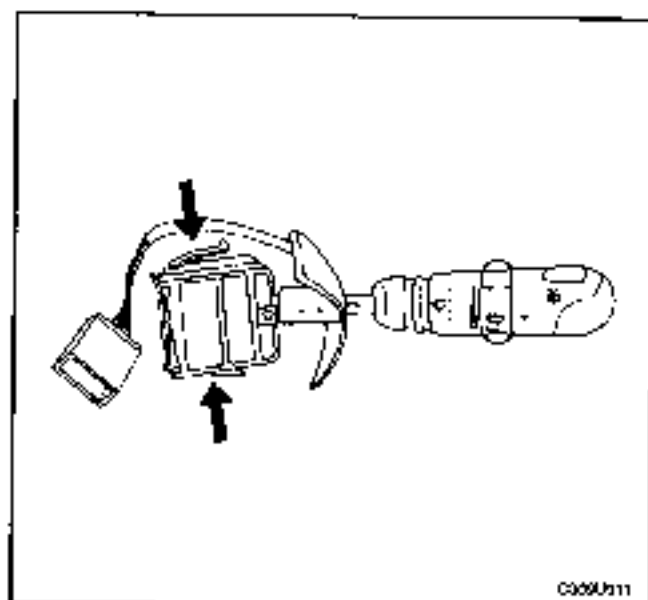
**LEVER SWITCH**

**Removal Procedure**

1. Remove the screws which retain the upper and lower steering column covers. It is not necessary to remove the steering wheel because access to the screws is possible by turning the steering wheel.

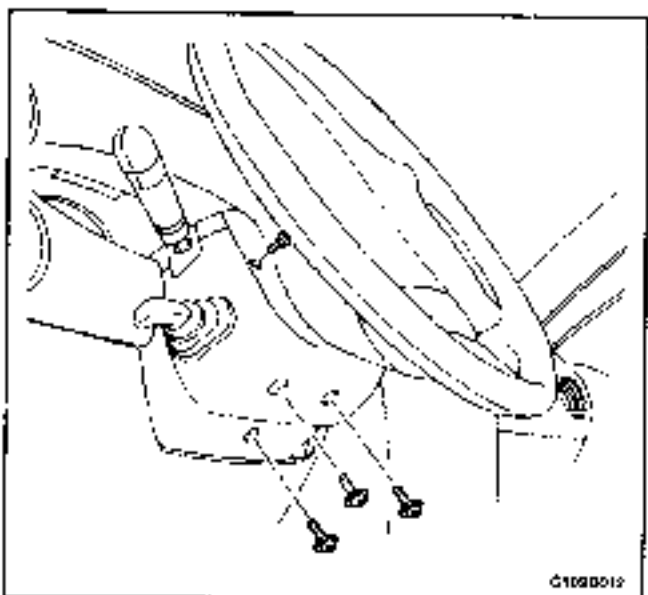


2. Remove the screw that attaches the hood release handle.



C309U011

3. Carefully remove the knee bolster trim panel by pulling until the retaining clips are free from the slots in the instrument panel.
4. Remove the upper and the lower steering column covers.
5. Depress the retaining tabs of the cruise control lever switch.
6. Slide the cruise control switch away from the steering column.
7. Disconnect the electrical connectors from the cruise control lever switch.



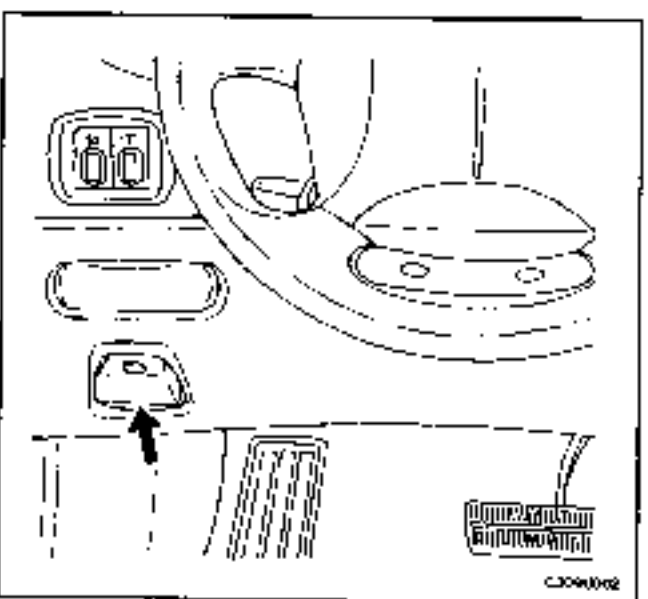
C109B012

### Installation Procedure

1. Align the cruise control switch and slide it toward the steering column until the retaining tabs lock.
2. Connect the electrical connectors to the cruise control lever switch.
3. Install the upper and the lower steering column covers with the screws.

### Tighten

Tighten the steering column cover retaining screws to  $N\cdot m$  (lb-in).



C309U012

4. Align the knee bolster trim panel and press the retaining clips into the slots in the instrument panel.
5. Install the hood release handle screw.

### Tighten

Tighten the hood release handle screw to  $2.5 N\cdot m$  (22 lb-in).



## GENERAL DESCRIPTION AND SYSTEM OPERATION

### CRUISE CONTROL SYSTEM OPERATION

The purpose of the cruise control system is to automatically maintain a vehicle speed set by the driver. When the cruise control is activated, speed is maintained or increased by means of an electronically controlled cable attached to the accelerator assembly. If the vehicle must be slowed to maintain the speed that was set by the driver, the cruise control system allows the throttle return spring to close the throttle.

If driving conditions require sudden acceleration after the cruise control has been set, speed can be increased in the normal manner by manually pressing the accelerator. The cruise control is disengaged if the brakes (or clutch, with manual transmission) are applied.

The minimum speed for setting the cruise control is 38.6 km/h (24 mph). When cruise control is operating, the CRUISE indicator lamp is turned on in the instrument cluster.

The cruise control system is capable of monitoring internal software and hardware faults as well as external faults in the connectors and wire harness. If a fault is detected, cruise control is stopped immediately, and the program logic and hardware logic independently prevent the cruise control from opening the throttle.

The cruise control will function in temperatures ranging from -40°C (-40°F) to 85°C (185°F). Maximum temperature could cause the regulation properties to be out of tolerance, but the safety shutdown is still operational under maximum temperature conditions. If high temperature interferes with cruise control operation, the actuator electromagnetic clutch will open, and the throttle return spring will close the throttle unless the accelerator pedal is pressed.

### CRUISE CONTROL ACTUATOR

The cruise control actuator is a single component system. The electronic controls are combined in one housing with the mechanical components. The actuator is mounted in the passenger compartment.

The mechanical components of the cruise control actuator are listed below:

- Permanent field DC motor.
- Single stage belt transfer gearing.
- Spindle drive.
- Electromagnetic clutch.
- Clutch plate with cable attachment.
- End switches.
- Plastic housing with noise reduction cover.
- Damping unit for clutch plate slap.

The mechanical parts are not serviceable. The entire actuator must be replaced if it is mechanically defective.

The electronics of the cruise control system include the following items:

- A microprocessor which controls speed regulation and monitors input signals.
- A clutch activation circuit which energizes the clutch magnet in order to couple the DC motor to the control cable.
- A driver circuit which activates the DC motor in a clockwise or counterclockwise direction.
- A control unit for lamp activation.

The electronic parts are not serviceable. The entire actuator must be replaced if there is an electronic defect in one of the systems.

### LEVER SWITCH

After the main switch is turned ON and the neutral position of the lever switch is detected by the cruise control actuator, the following operations can be performed by using the cruise control lever switch:

#### Set

If the cruise control is ON and the minimum speed is 38.6 km/h (24 mph), but not more than 155 km/h (96 mph), the target speed can be set by selecting the SET button for 10 to 300 milliseconds. If SFT is selected for more than 300 milliseconds, the cruise will be activated in the (COAST) function. If the accelerator is pressed by the driver after the cruise control has been set, the previous target speed will be maintained when the accelerator is released. If the accelerator is pressed by the driver until the actual speed is more than 35 km/h (22 mph) over the target speed, or until the vehicle exceeds 160 km/h (99 mph), the cruise control will disengage.

#### Coast

If a target speed has been set and (COAST) is selected for at least 300 milliseconds, the throttle is allowed to return to idle, and the vehicle will coast. When the (COAST) switch is released, the current speed will be maintained as the new target speed. If the vehicle speed drops below 32.2 km/h (20 mph) while coasting, the cruise control will be disengaged. If the switch is released between 32.2 km/h (20 mph) and 38.6 km/h (24 mph), the minimum target speed of 38.6 km/h (24 mph) will be used.

#### Resume

If the cruise control is ON, and the system was disengaged by using the brake or clutch, exceeding the maximum speed, failing to maintain the minimum speed, or exceeding the target speed by more than 35 km/h (22 mph), the last memorized speed can be reset by selecting RESUME if the time since disengagement is not greater than 5 seconds. The RESUME function is se-

lected by switching to RESUME for 10 to 300 milliseconds. If the actual speed is below the target speed when RESUME is selected, the vehicle will be accelerated at 3.4 km/h per second (2.1 mph/second) until the vehicle is within 10 km/h (6 mph) of the target speed, and then acceleration will be reduced in order to achieve a smooth transition from acceleration to cruising. If the actual speed is above the target speed when RESUME is selected, the throttle will be allowed to return to idle until the target speed is achieved. RESUME can be canceled by selecting SET, and then the current speed will be maintained as the new target speed.

### Accelerate

If cruise control is ON, and the (ACCEL) switch is selected for more than 300 milliseconds, the vehicle will accelerate. The acceleration is maintained at the rate of 3.4 km/h per second (2.1 mph/second) as long as vehicle performance is sufficient; otherwise, full throttle is applied. When the switch is released, the current speed will be stored and used as the new target speed. The (ACCEL) switch cannot be used for acceleration above 155 km/h (96 mph). If 155 km/h (96 mph) is attained, acceleration will stop and 155 km/h will be set as the new target speed.

### Tap-Up

If the cruise control has been set, and RESUME is selected again for more than 10 milliseconds but less than

300 milliseconds, the target speed will be increased by 2 km/h (1.2 mph) for each time that the RESUME button was selected (or tapped). If the driver has used the accelerator to increase speed over 8 km/h over the current target speed, a tap-up signal will be interpreted as a normal SET signal. The cruise control will not accept a tap-up target speed above 155 km/h (96 mph). If the actual speed has fallen 16.1 km/h (10 mph) below the target speed, tap-up signals are not accepted.

### Tap-Down

If the cruise control is already set and SET is selected for between 10 and 300 milliseconds, the target speed will be decreased by 2 km/h for each time that SET was selected (or tapped). Tap-down signals will not be accepted for a target speed below 38.6 km/h (24 mph). If the vehicle speed has increased to 8 km/h (5 mph) over the target speed, the cruise control system will interpret a tap-down signal as a SET.

If the cruise control is turned OFF with the main switch, all cruise control functions are stopped, the actuator cable is driven toward idle, and then the electromagnetic clutch for the cable actuator is opened. The cable actuator clutch is not opened immediately to accomplish a smooth transition in vehicle speed. If the cruise control is off for more than 5 seconds, the memorized target speed is erased.

# INDEX



# INDEX

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